The Sri Lankan HoSpitalist

A Peer - reviewed journal

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What *SLH* Authors Should Know?

The Journal "Sri Lankan Hospitalist" (SLH) is an editorially independent publication owned by the Critical Care Forum of Sri Lanka. The foremost mission of the Journal is to promote and disseminate evidence for practice, policy, and education. SLJH aims to provide a medium for the publication of original contributions to clinical practice and public health and/or research in all fields of Medicine. The Journal adheres to the criteria of the International Committee of Medical Journal Editors.

The Editor's preferred method for receipt of manuscripts for consideration is via e-mail to: …….(should add the new email address)when the web site is ready.

Articles are peer reviewed by clinicians or researchers expert in the field of the submitted work. The Editors welcomes the submission of reviews, original articles, case reports, and letters, and has an aim to provide authors with an initial response within six weeks of receipt of a manuscript that is in a format consistent with these instructions.

Original Articles should not exceed 2500 words and should be arranged under the usual headings of Abstract (less than 250 words), Introduction, Methods, Results, Discussion and References. Clinical trials should be written in accordance with the CONSORT standards, which can be found at http://www.consort-statement.org/ and observational studies in accordance with the STROBE guidelines, which can be found at http://www.strobe-statement.org/.

Brief Communications should be between 500 and 1000 words, have no more than 20 references, have a short unstructured abstract no longer than six lines, and have no more than two tables or figures. It is possible that articles submitted as full length articles may be considered to be more appropriate as Brief Communications.

Letters to the Editor should not exceed 500 words. Short relevant comments on medical and scientific issues, particularly controversies, are encouraged. Where letters refer to an earlier published paper, authors will be offered right of reply (no more than 500 words). Note that *Letters* and *Responses* are limited to 10 references.

Case Reports are published only if the report is of exceptional interest (ie an important clinical lesson or a previously unpublished point). They should be restricted to 500 words plus six references, with only one figure or table, and will be subjected to editorial review. Case Reports may *not* be subject to review if considered not of sufficient interest by the Editor.

Reviews The policy of the Journal is to publish high-quality review material covering both medical research and practice. Categories include: (i) Comprehensive Reviews of up to 3500 words, (ii) Short Reviews of up to 1500 words and 20 references, (iii) Clinical Perspectives are practical updates of management in major medical disorders of up to 2000 words and 20 references, (iv) Systematic Reviews with a maximum length of 3500 words. Papers in this category will be considered as Original Research articles. QUOROM and CONSORT standards are suggested to authors for guidance in this category (http://www.consort-statement.org/QUOROM.pdf and http://www.consort-statement.org/).

Articles on recent advances in field
should be between 500 and 1000 words, have no more than 20 references, have a short unstructured abstract no longer than six lines, and have no more than two tables or figures.

Articles on clinical therapeutics/CME
should be between 500 and 1000 words, have no more than 20 references, have a short unstructured abstract no longer than six lines, and have no more than two tables or figures.

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ETHICAL APPROVAL

The Journal adheres to the Declaration of Helsinki of the World Medical Association. All manuscripts that report investigations involving human participants **MUST** include a statement regarding Ethics Review Committee (ERC) approval. In the event that ERC approval has been obtained, a statement to this effect should be included in the Methods section of the manuscript, and the ERC that approved the research should be identified in the covering letter accompanying the manuscript on submission.

If ERC approval was not obtained, a short explanation (1-2 sentences) to this effect is required.

AUTHORSHIP AND CONTRIBUTORSHIP

Authors must confirm that the content has not been published elsewhere and does not overlap or duplicate their published work. Exceptions are made for abstracts and reports from scientific meetings. Upon acceptance, all authors must certify that they will take public responsibility for the content and provide any relevant data upon request.

All authors must also certify that they have contributed substantially to conception and design or analysis and interpretation of the data, drafting or revision of content, and approval of the final version. This contribution must include: (i) conception or design of the study, or analysis and interpretation of data, or both, (ii) drafting the article or revising it for critically important intellectual content, and (iii) approval of the final 'to be published' version. All authors must take responsibility for the integrity of the work. Participating solely in the collection of data does not justify authorship. Copyright is transferred to the Critical Care Forum in Sri Lanka upon acceptance.

ACKNOWLEDGMENTS

Disclosure of all financial and material support is required. Upon acceptance, the first author will be asked to certify that all persons who have contributed substantially to the work but who do not fulfill authorship criteria have been listed.

PEER REVIEW

Except where otherwise stated, manuscripts are peer reviewed by two anonymous reviewers. The Editors reserve the right to modify manuscripts to eliminate ambiguity and repetition, and to improve communication between author and reader. The Editorial Board reserves the right to refuse any material for publication.

CONFLICT OF INTEREST

Author(s) must identify potential conflicts of interest, whether of financial or other nature. All sources of financial support for the research, including provision of supplies and services from a commercial organisation, must be listed on the title page, as should all institutional or corporate affiliation of the authors(s). Author(s) must also disclose any commercial affiliations, whether or not it is a source of funding. The letter of submission must identify specifically any financial involvement (eg employment, direct payments, consultantships, honoraria) within the past five years with a commercial organisation that might have any potential interest in the subject or materials discussed in the manuscript. If author(s) are uncertain as to the perception of a possible conflict of interest, full disclosure of competing interests at the time of manuscript submission is required. Financial information will be held in confidence during the review process so as not to influence it. If the paper is considered acceptable, the Editors will decide the extent to which disclosure is important for the readership, as well as the form of such disclosure, and will so notify the corresponding author. Competing interests will not necessarily disqualify a manuscript from publication.

PREPARATION OF MANUSCRIPTS

Manuscripts should be typed, doubled-spaced in 12pt font. The top, bottom and side margins should be 30 mm. All pages should be numbered consecutively in the top right-hand corner. The manuscript should be presented in the following order: (i) first page which includes the manuscript title, a short title, a word count of the main text and abstract, and key words, (ii) an abstract, (iii) text, (iv) acknowledgements, (v) references, (vi) figure legends, (vii) tables, (viii) figures, and (ix) appendices. These guidelines apply to all manuscripts submitted.

COVER LETTER

A cover letter should be provided, which includes a statement regarding the contribution of each author to the intellectual planning of the project, carrying out of the work, analysis of the data, and writing of the paper. All authors must include a covering letter giving consent for publication, signed by the corresponding author (i.e. the author to whom correspondence should be addressed), and stating on behalf of all the authors that the work has not been published and is not being considered for publication elsewhere. Disclose all possible conflicts of interest (e.g., funding sources).

MEASUREMENTS AND ABBREVIATIONS

All measurements must be given in SI units as outlined in the latest edition of *Units, Symbols and Abbreviations: A Guide for Medical and Scientific Editors and Authors* (Royal Society of Medicine Press, London). Statistics and measurements should always be given in numerals (ie 20 mm), except where the number begins a sentence. When a number does not refer to a unit of measurement it is spelt out, except where the number is greater than nine. Abbreviations should be used sparingly and only where they ease the reader's task by reducing repetition of long, technical terms. Initially use the word in full, followed by the abbreviation in parentheses. Thereafter use the abbreviation. Abbreviations such as eg and ie should only be used in parentheses. Drugs should be referred to by their generic names, rather than brand names.

TITLE PAGE

Title should be concise, specific, and informative, and should contain the key points of the work.

The title page **must** contain the following information:

1. The title.
2. The name, postal address, e-mail, telephone, and fax numbers of the corresponding author.
3. The full names, institutions, city, and country of all co-authors.
4. Up to five keywords or phrases suitable for use in an index (it is recommended to use MeSH terms).
5. Word count - of the main text and abstract, excluding title page, abstract, references, figures and tables.

MANUSCRIPT

First page

The first page of the manuscript file should contain: (i) the title of the paper and (ii) a short title (running head) not exceeding 50 characters (including spaces), The first page should NOT contain information identifying the authors or institutions, as this journal conducts blinded peer-review.

Abstract and key words

Please write your abstract so that it accurately summarizes your article independently of the article. Avoid passive voice except when describing methods, and use past tense for actions taken in the past. Submissions to the Case Reports, *Editorials*, and *Letters* do not require an abstract. Brief Communications should have a short unstructured abstract of no more than 6 lines. Each original manuscript should carry a structured abstract of not more than 300 words presented in the following form.

Background: Brief statement of relevant work or clinical situation, and hypothesis, if applicable.

Objectives: Brief statement of the overall aim.

Methods: Laboratory or other techniques used, including statistical analysis. Outcome measures clearly stated.

Results: Statistically significant results and relevant negative data cited.

Conclusions: Referable to the aims of the study and may include suggestions for future action.

Five key words should be supplied below the abstract and should be taken from those recommended by the US National Library of Medicine's Medical Subject Headings (MeSH) browser list at http://www.nlm.nih.gov/mesh/meshhome.html.

Text

Authors should consider the use of appropriate subheadings to label sections of their manuscript. The Methods section should carry a statement confirming clearance of the study by an approved Ethics Review Committee. Statistical methods used must be specified.

Acknowledgements

Acknowledgement of grants and other sources of funds should appear after each article, including a frank declaration of the authors' industrial links/affiliations. Other contributions that fall short of the requirements for authorship may also be acknowledged.

References

- References should appear after the main text (and before tables and figures) in the manuscript file.
- In the text, references should be cited using superscript Arabic numerals in the order in which they appear.
- The references should be numbered and listed in order of appearance in the text.
- If cited only in tables or figures, number them according to the first identification of the table or figure in the text.
- Cite the names of all authors when there are six or less; when seven or more list the first three followed by *et al.*
- Names of journals should be abbreviated in the style used in *Index Medicus*.
- Reference to unpublished data and personal communications should appear in the text only.
- At the end of the article the full list of references should follow the Vancouver style (www.nlm.nih.gov/bsd/uniform_requirements.html).
- Remove all automatic footnotes and endnotes, and all automatic links between citation numbers and the references.
- References should be listed in the following form.

Journal article

The authors' names are followed by the title of the article; the title of the journal abbreviated according to the style of Index Medicus; the year of publication; the volume number; and the first and last page numbers.

1. Tooth L, Ware R, Bain C, Purdie DM, Dobson A. Quality of reporting of observational longitudinal research. *Am J Epidemiol* 2005;161:280-288.

Book

References to books should give the names of any editors, place of publication, editor, and year.

Examples:

2 .Kaufmann HE, Baron BA, McDonald MB, Waltman SR (eds). The Cornea. New York: Churchill Livingstone; 1988.

Chapter in a Book
3 .McEwen WK, Goodner IK. Secretion of tears and blinking. In: Davson H (ed.). The Eye, Vol. 3, 2nd edn. New York: Academic Press; 1969; 34-78.
For material published online, give the authors, title, name of website, date of publication as given on the web page, and URL.
Information from manuscripts not yet in press or not yet published online, papers reported at meetings, or personal communications should be cited only in the text, not as a formal reference. Authors should get permission from the source to cite personal communications.

Tables

Tables should be self-contained and complement, but not duplicate, information contained in the text. Tables should be numbered consecutively in Arabic numerals, with a descriptive, self-explanatory title above the table. Column headings should be brief, with units of measurement in parentheses. All abbreviations should be explained in a footnote. Tables should be double-spaced and vertical lines should not be used to separate columns. Footnotes should be designated by symbols in the following order: †, ‡, §, etc; significance values should be indicated by *, **, ***, etc.
If references are cited within a table or figure, they should be ordered as though they fall at the first callout (i.e., text mention) of that table or figure.

Flowcharts depicting study design or recruitment of participants are not necessary and should not be included if they duplicate text. Exceptions may be made for complex or novel study designs.

Figures

Figures must be created with a computer program and submitted in their original formats, NOT placed in Word or PowerPoint. All illustrations (line drawings and photographs) are classified as figures. Figures should be cited in consecutive order in the text. Magnifications should be indicated using a scale bar on the illustration. All figures must be done in black and white unless special arrangements have been made for the use of color.
Figures must be supplied electronically as high resolution (at least 300 dpi) files. Digital images supplied only as low-resolution files cannot be used.

APPENDIXES

On occasion data that may not be easily presented in text or figure form may warrant the use of an appendix. Appendixes should be created as a supplementary file to the manuscript.

STYLE

Abbreviations and symbols must be standard and SI units used throughout except for blood
pressure values which are reported in mm Hg.
Whenever possible, drugs should be given their approved generic name. Where a proprietary (brand) name is used, it should begin with a capital letter.
Acronyms should be used sparingly and fully explained when first used.
English, not American:

- aetiology
- oestradiol
- anaemia
- haemorrhage
- Foetus and fetus are both acceptable in

English: the BMJ uses fetus.

Use s-spellings:

- minimise
- organisation
- capitalisation

PROOFS

Alterations to the proofs must be limited to misprints or error of fact; major alterations of wording cannot be accepted at this stage. Proofs not returned in this time will be assumed to be acceptable.

SUBMISSION CHECKLIST

- Cover letter with conflict of interest disclosure
- Justification for more than 6 authors
- Explanation of authors' contributions
- Abstract (correct format and word limit)
- Text (manuscript file in Word format)
- References (accuracy, style, and numbering)
- Acknowledgments (funding sources, contributors who didn't fulfill authorship requirements)
- Human Participant Protection (ERC approval, consent)
- Tables (numbered, with title and footnotes)
- Figures

REVIEW, EDITING, AND PRODUCTION

We acknowledge new, revised, and resubmitted manuscripts upon receipt. Peer review of the manuscripts takes 1-2 months from submission. The review process is double-blinded, with authors unaware of the identities of reviewers and reviewers unaware of the identities of authors until acceptance. The time from submission to final acceptance of reviewed/revised papers averages 3 months. Upon acceptance, authors will be asked to submit final version source files for editing and production. Corresponding author will be replied within three months following submission regarding the progress of the article.

The reviewers should address the following issues in the comments to the editor for all manuscripts:

The general guideline of the journal 'Sri Lankan Hospitalist" for all original research:

- Does this manuscript address a clearly focused issue or stated hypothesis?
- Is this manuscript original in the manner in which it addresses the issue /hypothesis?
- Are the results relevant to the focus/hypothesis?
- Are the conclusion drawn warranted from the data and its interpretation?
- In the methodology adequately described?
- Are the individuals who were studies described adequately and are groups properly compared? The subjects adequately described and are group properly compared?
- Were all those entered into the study accounted for?
- If relevant, is the sample size calculation clear, and is the sample adequate?
- Are the figure and tables clear, understandable and necessary?

In addition to general guideline of the journal 'Sri Lankan Hospitalist", for randomized controlled studies

- Was the randomization to treat group used and was that process appropriate?
- Were the treatment and control groups similar at the trial?
- Are the subjects adequately described and are groups properly compared?
- Were the subjects and investigators kept 'blind' about treatment allocation? (Not always possible)
- Apart from the treatment under investigation, were the groups treated equally?
- Were all those entered into the study accounted for?
- Were all the subjects analysed in the groups to which they were randomly allocated?
- Is the scale and direction of the measured effect(s) stated?
- Is any statistical measure of uncertainty given? (eg. Confidence intervals, p values)

In addition to the general guideline of the journal 'Sri Lankan Hospitalist", for cohort studies:

- Are the source populations comparable? (I.e. are exposed and unexposed subjects, or subjects with different levels of exposure, or subjects with different levels of prognostic markers, or subjects with different prognostic factors, the same?)
- Are participation rates at enrolment, by exposure, indicated?
- Is the likelihood that some eligible subjects might have the outcome at the time of enrolment assessed and taken into account in the analysis?
- What percentage of individuals or clusters recruited into the study is included in the analysis?
- Is there any comparison between full participants and those lost to follow up, by exposure status?
- Are the outcomes clearly defined?
- Is the assessment of outcome made blind to exposure status?
- If blinding was not possible, is there evidence (direct or indirect) of the influence of knowledge of exposure status on the assessment of outcome?
- Was the method of assessment of exposure or prognostic status adequate?
- Is there evidence that the method of assessment used was valid and reliable?
- Is exposure level or prognostic factor assessed more than once?
- Are the main potential confounders identified and taken into account adequately in the design and analysis?
- In the scale and direction of the measured effect(s) stated?
- Is any statistical measure of uncertainty given? (eg. Confidence intervals, p values)

In addition to general guideline of the journal 'Sri Lankan Hospitalist", for case control studies:

- Are the cases and controls taken from comparable populations? Are the same exclusion criteria used for both cases and controls?
- What percentage of each group (cases and controls) participated in the study?

- Are cases clearly defined and differentiated from controls? Is it clearly established that controls are non-cases?
- Is there any comparison of participants and non-participants to establish their similarities or differences?
- Have measures been taken to prevent knowledge of primary exposure influencing case ascertainment?
- Is the exposure measured in a standard, valid and reliable way?
    - Are the main potentials confounders identified and taken into account adequately in the design and analysis?
- Are the subjects adequately describe and are group properly compared?
- Were all those entered into the study accounted for?
- Is the scale and direction of the measured effect(s) stated?
- Is any statistical measure of uncertainty given? (eg. Confidence intervals, p values)

In addition to general guideline of the journal 'Sri Lankan Hospitalist", for qualitative research:

- Is the research question clearly defined?
- Overall, does the researcher make explicit in the account the theoretical framework and methods used at every stage or the research?
- Is the context clearly described?
- Is the sampling strategy clearly described and justified?
- Is the sampling strategy theoretically comprehensive to ensure the generalisability of the conceptual analysis (diverse range of individuals and settings, for example)?
- How is the fieldwork undertaken? Was it described in detail?
- Are the procedures for data analysis clearly described and theoretically justified? Do they relate to the original research questions? How are themes and concepts identified from the data?
- Is the analysis repeated by more than one researcher to ensure reliability?
- Does the investigator make use of quantitative evidence to test qualitative conclusions where appropriate?

Recommendation

- (•) Accept
- ( ) Minor Revision
- ( ) Major Revision
- ( ) Reject

Would you be willing to review a revision of this manuscript?

- ○ Yes
- ○ No

Reasons for the recommendation and suggestions for revision?

.....
.....

Call for submissions

The journal of Sri Lankan hospitalist is a biannual, international, peer reviewed journal dedicated to presenting research advances and applications starting from pre hospital care to community through emergency department and ICU. Although the Sri Lankan Hospitalist focuses on research emphasis, it is intended to be useful to all areas in health care delivery systems starting from bench to bed site. The journal invites submissions in high quality scholarly articles addressing all aspects of patient care delivery as mentioned above. We welcome manuscripts covering the entire healthcare delivery system in a holistic approach. Submissions are invited for the following sections.

Original articles

Clinical investigations in all aspects of patient care management Manuscripts describing scientific results will be considered for publication provided that there's strong clinical relevance. The priority will be given for those emphasising holistic approach

Case reports

Preliminary communications or reports on authentic, unusual or otherwise important articles of patient care delivery.

Systematic review

In depth reviews of current understanding, implementation of research and clinical applications.

Letters to the Editor

Brief commentaries or alternative points of view with regarding papers published in the journal.

The great teachers all times

This is a short account of the pioneers in western medicine who dedicated their lives for developing art and science of medicine.

Anecdote

A short, interesting or amusing story narrated by a clinician.

Introduction to the Editorial Board

Executive Editor

Dr. Aruna Munasinghe

Dr. Aruna Munasinghe is the senior consultant physician in charge of the Sri Lanka – Victoria Emergency and Trauma Care Centre, Teaching Hospital Karapitiya. He graduated from the Colombo Medical School and completed his post doctorial Training at the Townsville Hospital affiliated to the James Cook University, North Queensland Australia. He is the first and only Sri Lankan having the prestigious fellowship of the American College of critical care Medicine.

In addition to many achievements he holds a Diploma in Mechanical Ventilation from the University of Paris. He pioneered many critical care and Emergency Medicine concepts to Sri Lanka including point of care Sonography in Emergency and Critical Care.

He is also considered as the first person who introduced lung ultrasound and Mechanical ventilation formal training to Sri Lanka. He is the founder president of the Critical Care Forum as well as the current secretary general of the association of SAARC critical care societies.

He is also involved in several clinical trials and a winner of the presidential award for research. He was recently appointed as a member of the National Science Foundation in Sri Lanka by the Ministry of Science Technology and Atomic Energy.

Editor in Chief

Professor Chrishantha Abeysena
Professor/Department of Public Health,
Faculty of Medicine,
University of Kelaniya,
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Professor Chrishantha Abeysena graduated from the University of Colombo in 1992 and received his MSc and MD in Community Medicine from the Postgraduate Institute of Medicine, University of Colombo. He undertook his post doctoral training at the Monash University, Australia, gaining experience in Clinical Epidemiology, Biostatistics, and Health Service Management. He worked in the Ministry of Health until the end of 1996 and then joined the University of Kelaniya. Currently he is a Professor in the Department of Public Health of the Faculty of Medicine, University of Kelaniya. He is the site Coordinator of the South Asian Cochrane Network and Centre and a pioneer in promoting evidence based medicine in Sri Lanka.

Associate Editor

Dr. Kapila Jayaratne

Consultant Community Physician
National Programme Manager - Maternal & Child Morbidity & Mortality Surveillance
Family Health Bureau - Ministry of Health

Dr. Kapila Jayaratne graduated and specialized in public health from University of Colombo and had post-doctoral training at University of Melbourne. Following working in both clinical and preventive sectors at peripheral and national level, currently he works as a National Program Manager at Family Health Bureau, Ministry of Health. Dr. Jayaratne as the nodal person for maternal and child morbidity and mortality surveillance in Sri Lanka, conducts maternal death reviews, implemented feto-infant surveillance system and launched the pilot project on birth defects surveillance.

External Reviewer

Dr. Mahesh Nirmalan

He graduated from the University of Colombo, Sri Lanka in 1990 (MBBS) and obtained the MD (Anesthesiology) from the University of Colombo in 1994 and FRCA (London) in 1996. He worked for the Medical Research Council (UK) Trauma Group between 1999-2001 and during this period and undertook research on the pulmonary consequences of shock.

This led to his PhD thesis "Quantifying pulmonary injury in shock" in 2001. He completed my specialist training in Anaesthesia & Intensive Care at the North West Deanery and was appointed Consultant in Anaesthesia and Intensive Care Medicine at Manchester Royal Infirmary in 2002.

Editorial Board

Dr Deepak Agrawal
ED office
Dept of Emergency Medicine
JPN Apex Trauma Center, AIIMS
New Delhi-29

Dr Deepak Agrawal is an acclaimed neurosurgeon with expertise in Gamma Knife & spine surgery working in All India Institute of Medical Sciences, New Delhi. He has been rated as one of the top 10 surgeons in India by the national daily 'Hindustan times'. He has also received numerous awards including the 'Young Neurosurgeon award' by the Congress of Neurological surgeons, USA. Dr Agrawal has more than 100 peer reviewed research publications in leading journals. Besides Neurosurgery he has interest in EMR implementations and is currently the chairman of the computerisation board at AIIMS.

Dr.Sanjeev Bhoi
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Dr. Bhoi graduated as a University gold medalist and is currently Associate Professor at the Department of Emergency Medicine at the JPN Apex Trauma Centre. This centre is a part of the premier academic institute of India, which is the All India Institute of Medical Sciences (AIIMS). He has been on various scholarships from the Government of India, Israel and the US. He received the **prestigious Micheal Moles fellowship** from world association of disaster and emergency medicine(WADEM) at Victoria ,Canada ,2009 and he has been elected as **Director ,board of directors of WADEM in May 2013**.With his international reputation in Emergency care and trauma, Sanjeev shares his learning as a mentor in Emergency Medicine.

He is the Instructor for the ATLS® (Advanced Trauma Life Support) by American College of Surgeons, ACLS (Advanced Cardiac Life Support), AHLS (Advanced Hazmat Life Support Course).He is trained in point of care ultrasound and has created AIIMS Ultrasound trauma life support course, AIIMS Emergency sonography course and recently he has started AIIMS Disaster Ultrasound program as program director. These courses are running across the country as well as Nepal, Sri Lanka and Iran. He was the organizing secretary of 7th world congress of emergency and critical care ultrasound

Professor Wasantha Gunathunga

Currently serves as the Head of the Department of Community Medicine of the University of Colombo. He graduated from the same university in 1989 and received postdoctoral training in the University of Western Australia. Though his main discipline is Community Medicine, he has a keen research interest in promotion of mental well being and in-depth study of body, mind and consciousness. He has supervised many doctoral and masters theses and has more than fifty research publications, scientific presentations, books and chapters of books. He is also embarked on improving soft skill and professionalism among the working community in Sri Lanka.

Mrs. Munasinghe P.P.Dilhani

She is a Senior Assistant Librarian in the Postgraduate Institute of Medicine, University of Colombo. She graduated BA (Hons) in 2003 in Library and Information Science and obtained her MSSc in 2011 in the same field from the University of Kelaniya, Sri Lanka. She is reading for PhD (2014) at Faculty of Graduate Studies at University of Colombo Sri Lanka. She is an academic and a researcher with the special interest in medical literature. She compiled several medical publications specifically Medical Orations and Presidential Addresses Delivered in Sri Lanka January 1990-2009 January (20 year collection) and Annotated Bibliography of Research Reports, Dissertations, Theses and Case Reports presented to PGIM by Postgraduate Trainees 1982 – 2010. She is a member of Sri Lanka Library Association and member of University Librarians Association.

(With apologies to Dr. P Ramanadan *MS, FRCS*)

"I specifically paused to show that, if there were such machines with the organs and shape of a monkey or of some other non-rational animal, we would have no way of discovering that they are not the same as these animals. But if there were machines that resembled our bodies and if they imitated our actions as much as is morally possible, we would always have two very certain means for recognizing that, none the less, they are not genuinely human. The first is that they would never be able to use speech, or other signs composed by themselves, as we do to express our thoughts to others. For one could easily conceive of a machine that is made in such a way that it utters words, and even that it would utter some words in response to physical actions that cause a change in its organs—for example, if someone touched it in a particular place, it would ask what one wishes to say to it, or if it were touched somewhere else, it would cry out that it was being hurt, and so on. But it could not arrange words in different ways to reply to the meaning of everything that is said in its presence, as even the most unintelligent human beings can do. The second means is that, even if they did many things as well as or, possibly, better than anyone of us, they would infallibly fail in others. Thus one would discover that they did not act on the basis of knowledge, but merely as a result of the disposition of their organs. For whereas reason is a universal instrument that can be used in all kinds of situations, these organs need a specific disposition for every particular action."

— René Descartes
Discourse on Method in Discourse on Method and Related Writings (1637)

"je pense. Done je suis"

The term Hospitalist is coined by the New England Journal of Medicine in 1996. Hospitalists are health care providers who dedicate most of their carriers to the care of hospitalized patients. Most of them are trained in internal medicine although a significant percentage may have family medicine, respiratory medicine, Paediatric, Psychiatric, Dermatology etc. Although this new discipline has been introduced to cater to the needs of the USA, we hope that a similar kind of reorganization of health care delivery system may be of useful to our country as well.

With an introduction of the term Hospitalist, we mean to develop a more holistic approach towards the patient. Therefore we welcome articles from all disciplines related to health care including medical administration.

De humani corporis fabrica

The full title is *Andreae Vesalii Bruxellensis, scholae medicorum Patauinae professoris, de Humani corporis fabrica Libri septem* (Andreas Vesalius of Brussels, professor at the school of medicine at Padua, on the fabric of the Human body in seven Books).

Reporting quality of health research

Professor Chrishantha Abeysena

Not only generation of evidence but reporting is also essential for policy makers, clinicians, patients, researchers, funders, peer reviewers, and editors. Many deficiencies have been identified in prior medical research. The essential information is not reported at all or, though reported, sometimes appear to be incomplete or unclear. Readers need to know what was planned (and what was not), what was done, what was found, and what the results mean. The assessment of the strengths and weaknesses of the studies reported in the medical literature is hampered by incomplete, inadequate and inaccurate reporting of research. Transparent and complete reporting of research has many advantages. It allows the critical appraisement of the research articles and it will ultimately facilitate to assess the quality of the studies. As the consequence readers will be able to judge the reliability and validity of the results. It also facilitates adequate inclusion of data in primary studies which are essential to be extracted for conducting systematic reviews.

Several initiatives have already been taken and fulfilled during the past 17 years to improve the reporting quality of health research. These ideas have evolved considerably over a period of time. Reporting guidelines are defined as a checklist, flow diagram, or explicit text to guide authors in reporting a specific type of research, developed using explicit methodology.[1] One of the successful developments of such an initiative is CONSORT statement for randomized clinical trials and its latest update on CONSORT 2010. Similarly, TREAND for non-randomised trials, STROBE statement for observational studies, STREGA for genetic studies, STARD for diagnostic accuracy studies and PRISMA for systematic reviews have been developed. In addition several initiatives have being taken to improve the quality of reporting of abstracts and protocols. These initiatives are facilitated by involving editorial staff from several international journals as well as epidemiologists, methodologists, statisticians, and practitioners. These guidelines/statements are being endorsed by a growing number of biomedical journals to improve the quality of reporting. The authors are strongly advised using these in conjunction with the explanatory article, which is available freely on the websites of the publishing journals. The authors stress the fact that these recommendations on the reporting of research should be seen as evolving documents that require continual assessment, refinement, and, if necessary, change. Further there is evidence that the use of reporting guidelines is associated with improvements in the quality of health research.[2]

These statements should not be interpreted as an attempt to prescribe the reporting of health research in a rigid format. The checklist items should be addressed in sufficient detail and with clarity somewhere in an article, but the order and format for presenting information depends on author preferences, journal style, and the traditions of the research field. The authors do not aim at standardising reporting.[3]

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The need for a holistic doctor

Professor MW Gunathunga

The physician evolved from the time of Hippocrates to a modern specialist over more than 2500 years. This evolution has gone beyond the point that the modern physician is no longer the healer that people expected him to be but rather a specialist who looks after only one part or a system in the body. Patients always look for a holistic physician to look after themselves. Hence, it is required to prepare the future physician to match up to the expectation of providing holistic care.

Healing the mind is more important than healing the body. Because, healing the body does not always heal the mind. However, if the mind can be healed the patient will not suffer even if the body is not healed. This brings us to the problem of understanding the body-mind, the complete inter-relationship of which is not comprehensible to many modern physicians except, perhaps to a handful of them in the whole world today.

In the written western literature, the body-mind dialogue dates back to the time of ancient Greeks. Rene Descartes provided some research evidence in support of body and mind as two, the dualism in the 16th century AD. However, the Buddha, lived in Indiain the 6th century BC comprehensively described an exceptional form of dualism where complete separation of the mind from the body can be achieved leading to a freedom from all ills of the body. Unfortunately this spiritual science does not appear to have been heard by Hippocrates born approximately a century later in Greece.

The modern sons of Hippocrates are still not too late to learn this phenomenological science of empowering the mind to heal itself fully. The technique is simple to learn. It, first, needs the vision to learn this phenomenological science of self-healing and deep wisdom. Second the enduring attitude to continue until the target is achieved. Trainee needs to freeze the physical body in a comfortable sitting position preferably cross legged on a four inch cushion on the ground with hands on the lap and closed lipped for a predetermined time of one hour. The mind is kept scanning the body using a number of external body parts to create a circuit. He lets go the thoughts generated from the outer environment, the physical body and from the stored memory. Training this regularly and daily will lead the mind to a quietude imparting a skill of functioning without personal biases, prejudices and the external disturbances. With this exercise the practicing physician will experience the separation of mind from the body with all the comforts and exceptional meta-cognitive skills (Gunathungaetal 2011) of it. These meta-cognitive skills are essentially required to help the modern day patient with complex mental states. Hence, the concept of hospitalist is a fitting proposition for now and for the time to come. The job of a hospitalist cannot be accomplished successfully without the physician acquiring meta-cognitive skills of mind. The knowhow of training physicians on this skill is fortunately now available in Sri Lanka. What is required is the vision and the commitment to acquire it.

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Community Emergency care initiative: The way forward in resource constraint countries

Dr. Sanjeev Bhoi

The Republic of India is the seventh largest country in the world and is home to nearly 1.2 billion people. Health care provision in India is multi-pronged, including a tiered national health system, private hospitals, and a multitude of alternative medicine practitioners. Trauma, natural as well as man-made disasters are common causes of fatalities. 20% of emergencies are trauma related in pre-hospital setting adding up to existing burden of other emergencies. WHO has estimated road crashes, cardiac as well as stroke as major causes of death by 2020. Currently 1,50,000 patient die per year due to road traffic crash in India. 90% of cardiac arrests occur outside the hospital; out of which 70% occur at home and 20% occur in workplace. 30% of acutely ill patients die before reaching the hospital in India and more than 80% of injured patients do not reach the hospital within golden hour. CPR for out of hospital cardiac arrest, stopping bleeding, early evacuation of a trauma victim is the key to good outcome. Current status of emergency care is lot to be desired at all tier of heath care system. There is a need for specialty of Emergency Medicine and emergency nursing which is still in its infancy in India. Pre-hospital care is not up to the mark, as it acts only as a transport vehicle[1]. In the urban area usually police and taxi-drivers are the first responders beside good Samaritan[2]. In the rural areas, patients are transported by carrying on shoulders (scoop and run), bullock carts and private vehicles. Personnel with minimal or no training, run these rescue vehicles. In the absence of training standards, the unskilled persons attempt life-saving tasks[3].

Basic emergency care training which includes cardiopulmonary resuscitation (CPR) is only theoretical in medical as well as nursing curriculum. Lack of structured basic emergency care training of healthcare and laypersons and miniscule pre-hospital care contributes to poor outcome. The author created a tailored made program named AIIMS basic emergency care course (BECC) which addresses the issue of basic emergency care skills for healthcare and non-healthcare personals (police, fire-fighter, paramilitary forces, school kids, teachers and other laypersons) considering the deficiencies and affordability in a resource-constraint setting. Author studied & proved that this initiative improved the knowledge and skill of healthcare workers and laypersons in basic emergency care in India.

The current status of Emergency care in neighbouring countries such as Nepal, Pakistan, Afghanistan, Burma Myanmar, Sri Lanka & Bangladesh is not different. Author proposes to disseminate the concept of community emergency care for effective prehospital care during peace and disaster in resource constraint countries.

Key words: BECC; Basic Emergency care Course: CPR; Cardio Pulmonary resuscitation.

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e-CPR : The Future hope for a silent heart

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In its Simplest form Extracoporeal support can provide an adequate circulation of oxygenated blood in order to rest or, improve or maintain tissues perfusion through an artificial environment cardio pulmonary by pass enabling complex cardiac surgeries and extracorporeal membrane oxygenahan (ECMO) in the treatment of lung injury are well established treatment modalities. In

this journal a detail account of the current status of this interesting therapeutic advancement has been described.

In Sri Lanka the first unit of ECMO is being planned to be stared at the cardio thoracic surgical department teaching Hospital Karapitiya following repeated request by Dr. Tolusha Harischandra[3], Dr. Aruna Munasinghe[4] in several occasions. The critical care forum of Sri Lanka organized the very first workshop on ECMO with the participations of Dr. Richard Firmin, a pioneer in this field in the U.K.[1] However out of hospital or the emergency use of extra corporeal support is still a dream in our opinion in Sri Lanka. Numerous technical advances such as portable devices and circuits, advancement in anti coagulation and vascular access has made the emergency use of extra corporeal support feasible in out of hospital settings according to MullerT, Lugno, N etal.[2]

In a recent issue of the Emergency Medical Journal (emj.bmj.com) an observational study of extra corporeal CPR for in hospital cardiac arrest has been published by Chou, Sang etal. In this interesting study the Kaplan-meire survival plot has suggested that deaths after conventional CPR occurred e-CPR deaths. Furthermore most e-CPR deaths had been due to multiple orgon failure / or overwhelmily sepsis. It is interest to note that the journal of the Royal College Physicians of Edinbrough has commented in one of its recent issue on the new techniques of keeping the heart alive following Myocardial infection in the light of new evidence that myocardial cells can regenerated themselves.

In Sri Lanka the author, and Harischandra T.[5] etal have already planned a major research based on how stem cell therapy can be utilized to get the heart regenerated.

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A paintings by Rembrandts, Sixteenth

Century

Current Status of Extracorporeal Membrane Oxygenation (ECMO)

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Extracorporeal membrane Oxygenation (ECMO) is an advanced life-support technique for adults and children, including neonates, with refractory cardiopulmonary failure. It is not a novel therapy as the first successful adult case was done in 1972. However, for more than 30 years it has been a controversial topic within the intensive care community. For the most part it has only been practised in a few specialist centres worldwide with even most of these doing fewer than 20 cases per year. The patients being supported with ECMO have usually been neonates with respiratory failure and children post cardiac surgery for congenital heart disease.

After publications of a National Institute of Health (NIH) randomised trial[1] and the Morris study of modified ECMO (ECCOR – extracorporeal CO^2 removal)[2]were reported, adult ECMO was largely abandoned leaving about 5 centres worldwide to explore the application of the technologyin adults further. Neither of these studies is, however, relevant to current practice as both medical management and current ECMO technology have changed markedly since then. The centres who continued to develop adult ECMO reported observational studies showing benefit for ECMO support in specific situations[3,4].

One of the concepts that has changed in ventilation practice is the certainty that high pressure, high volume strategies damage and further delay healing of the injured lung. This was an idea introduced into clinical practice by Gattinoni and colleagues[5]in their practice of ECCOR. Although it is now evidence based practice to use a long volume ventilation strategy and permissive hypercapnoea[6], ECMO centres have been practising this much longer. Indeed, many patients on ECMO are now managed spontaneously breathing through a tracheostomy rather than sedated and ventilated.

The recent upsurge in interest in ECMO has been because of a coincidence of several factors: firstly, there were major improvements in the technology; secondly, a randomised controlled trial of ECMO for ARDS reported (CESAR Study)[7], and thirdly, there was a worldwide Infuenza A (H1N1) pandemic.

Until recently (about 2007) ECMO was generally practised using a roller pump, controlled by a collapsible bladder and a solid silicone membrane oxygenator. It was soon apparent to anyone trying to use this technique that it was difficult and time-consuming to use this system, particularly on an infrequent basis. As the numbers of cases were small, there was little investment by industry so that technical developments were slow. When they did come, however, they came quickly and fitted together well.

On the technical side, the first development was of polymethylpentene (PMP) oxygenators. They are hollow fibre devices which have a low resistance to blood flow like their polypropylene counterparts used routinely for cardiopulmonary bypass but, unlike them, they do not plasma leak after 24 hours. Current devices are licensed for 14 days but in practice last much longer. Next, highly efficient and durable magnetically driven impeller blood pumps were developed for both ECMO and as ventricular assist devices (VADs). Finally, purpose-built, percutaneously inserted, silastic wire-wound double lumen cannulae with low recirculation characteristics were developed. Combining these technologies meant that a very efficient system without the inherent danger of circuit rupture could be produced. Originally, 2 nurses per patient were required; 1 for the circuit and 1 for the patient. Now 1 nurse can manage both. The simplicity of the modern circuit has tempted some to try ECMO without the necessary planning and training in the technique. This is a mistake as there are

still traps for the uneducated, particularly massive air entrainment and difficulties in managing patients who bleed.

My own unit, the Heart Link ECMO Centre in Leicester, UK was involved in two major ECMO trials. The first was the UK Collaborative Trial[8] of neonatal respiratory failure which showed a clear benefit for giving ECMO support. As a result, a 5 centre national service was established in the UK and this continues to the present time.

The second was the CESAR Study for adult respiratory failure. In this trial patients were randomised to receive conventional intensive care or be transferred to a single ECMO centre (Leicester) The study showed a statistical benefit for this approach for patients with a Murray score exceeding 3.0. There were, however, confounding factors in the study in that delays caused a higher than previously experienced mortality in transfer to Leicester and some of the ECMO arm were managed conventionally.

An important feature of both these trials was that the end-points were not simply survival although this was obviously important. In each study, 'intact' survival was required. In the case of neonates, this was at a neurological examination at 1 year and, in the adult study, functional independence at 6 months. Because there is little long term information on follow up of intensive care patients in general, much less ECMO patients, it is gratifying to know that the long term follow-up of these patients is excellent with very little chronic morbidity. Provided they were otherwise healthy before their acute illness, they usually go on to have a normal life.

Coincident with the publication of the Cesar Study, there was an Infuenza A (H1N1) pandemic which behaved in an unusual way. Instead of the elderly bearing the brunt of the mortality, it was the younger age group (18-35 years) who had not been exposed to this type of virus who were most at risk. Obesity and pregnancy were specific additional risks. Thus a significant number of previously fit and well young adults presented who could not be ventilated conventionally. It was not secondary infection causing this picture but the primary viral pneumonitis. Initially, it was the Southern Hemisphere that was affected with ICU's in Australia and New Zealand having to curtail cardiac surgery to cope with the demand. The subsequent hit on the Northern Hemisphere was also significant and ECMO was used on a scale never seen before. Prospectively collected data from Australasia[9] and Europe[10] showed a significant benefit from ECMO in these patients with about 80% surviving.

These data related to Influenza A (H1N1) taken together with the data from the Cesar Study suggest that ECMO does have a role in the severest forms of respiratory disease. Although a Murray score of 3.0 may be a little low to recommend ECMO support, I think the experience from the two winters of Influenza A (H1N1) suggests it should be used above 3.5. With current information, it is unlikely that a fully randomised trial of ECMO could now be conducted without crossover being part of the design, eg the EOLIA Trial currently underway in Europe[11]. This will limit the usefulness of such data in the future.

In the UK, the response to the CESAR Study and the InfuenzaA (H1N1) pandemic has been to commission a 5 centre adult service to complement the existing neonatal service, with transport of such critically ill patients as part of the service. Increasingly this is being done using ECMO support as the modern circuit makes this much easier and safer than previously.

From the available evidence in the literature and the Extracorporeal Life Support Organisation's (ELSO) database[12] which has extensive case based information, I believe the current indications for ECMO support are:-

1. Severe neonatal respiratory failure with an Oxygenation Index >40.

2. Support for older children with severe, potentially reversible, respiratory failure despite good medical management.
3. Cardiorespiratory support following corrective cardiac surgery, usually for congenital heart disease.
4. Support to recovery, VAD or transplantation for children with acute myocarditis.
5. Bridge at all ages to heart, heart-lung or lung transplantation.
6. Support for reversible acute right heart failure such as in acute pulmonary embolism.

Beyond these general considerations, one should not be too prescriptive. The essence of selection is in estimating whether the condition is any case self-limiting with temporary support or can be effectively treated for recovery. In practice the difficult areas are patients with treatable malignancies or immune deficiency like HIV/Aids. Some infections in these patients will be manageable at certain stages of their disease if antibiotics or anti-virals are likely to be effective. Other infections, for example cytomegalovirus in a bone marrow transplant patient, are not.

The mode of ECMO is important and the physiology of the different modes of ECMO is often ill understood, not least by cardiac surgeons who think that ECMO is just expensive cardiopulmonary bypass. In veno-venous support, blood is removed from the great veins and re-infused back into the same system. There is no circulatory support and respiratory support does not usually achieve 100% arterial saturation. Typically, with modern cannulae, with an adequate cardiac output, there will be a 85-90% saturation on the arterial side with the patient being ventilated with low oxygen, low frequency and low pressure. In veno-arterial support in small children (<2 years), the cannulation is from the jugular vein/ right atrium with return to the aortic arch via the carotid artery. Such patients will have 100% peripheral saturation. In adults or older children, cannulation of the femoral vessels will give excellent cardiac support but, because the heart is normally filled (often overfilled) and ejecting, the upper body will be de-saturated and the lower body pink ('Harlequin' effect). Thus in terms of central oxygenation, veno-venous is better. In post cardiac surgery patients, cannulation is often central through the operative incision and these considerations do not apply.

As has been mentioned, ECCOR has been used to allow reduced ventilation. As well as conventional ECMO circuits, arterio-venous CO_2 removal has been used with arterial blood pressure driving the oxygenator blood flow[13]. This can be useful in emergency situations but conversion to a veno-venous ECMO circuit will usually be better. Other attempts using haemofiltration devices as ECCOR systems are unsatisfactory, as 1 – 1.5 litres blood flow is required through the oxygenator to effect meaningful CO_2 removal and such devices are gated at 500ml flow.

The challenge for any country wishing to consider ECMO support in its healthcare systems, whether with private or public funding, is how to maximise the benefit whilst minimising the cost. There should be only a small number of centres supported by an efficient transport retrieval system. The options include using helicopter transfer for longer retrievals or having ambulances that can function as mobile intensive care units. Although the equipment is relatively expensive, most of the expense is actually in staffing.

In terms of Sri Lanka, there is a recognised need for neonatal ECMO for severe meconium aspiration syndrome and post cardiac surgery for congenital heart disease. There will be a smaller need for ECMO and VAD support in older children and in the adult population for respiratory failure and post cardiac surgery. These needs will change if heart and lung transplantation develops. Thus the challenge for the professionals and administrators in both the public and private sectors is to

develop ECMO services that are relevant to the population needs and that concentrate expertise to produce consistently good results. Be warned that ECMO, even with modern technology, is not a daytime activity but a 24 hour one that requires dedication and hard work from all staff to achieve reproducible results. However, the appraisal, education and development necessary to develop an ECMO centre lead to wider benefits that are not just limited to the severely ill who require ECMO. The improvements in transport and respiratory care management that accrue mean that such units become, in effect, Advanced Respiratory and Cardiac Care Units using all the available options and not just ECMO.

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GUIDELINES FOR MANAGING HEAD & SPINAL INJURY PATIENTS

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Introduction

In absence of standards of care, the management of head & spinal injured patients is based on institutional protocols. In this article we provide the current level of evidence for each facet of care in head injured patients and the protocol followed at All India Institute of Medical Sciences, New Delhi. The article is written in a unique 'step-wise' approach which is easy to understand and may be relevant for healthcare professions working in emergency departments and intensive care units not only in India but across South East Asia.

MANAGEMENT OF SEVERE HEAD INJURIES

Q: A 25 year old adult travelling in a car suffers a high speed collision and needs to be extricated from the vehicle by emergency workers. On arrival in ED he is unconscious, with right ear bleed and obvious bleeding from the scalp. His pulse is 56/min and BP is 180/96 mmHg. The right pupil is dilated and not reacting and his breathing is laboured. Smell of alcohol is positive.

Step 1: INITIAL ASSESSMENT: Airway, Breathing & Circulation (ABC) take precedence in spite of obvious head injury .

Airway & Breathing-

- Apply cervical collar & check airway.
- Hypoxia ($PaO_2 < 60$ mm Hg or O_2saturation <90%) should be avoided. Intubated & ventilate with 100% oxygen in case of threatened airway with manual in-line cervical immobilization.
- Mild hyperventilation ($PaCO_2 \geq 33$ mm Hg & ≤ 36 mmHg) is recommended as a temporizing measure for the reduction of raised intracranial pressure.
- Prophylactic hyperventilation ($PaCO_2$ of 25 mm Hg or less) is not recommended

Circulation:

- Maintain BP >100systolic. Manage hypotension (systolic blood pressure 90 mm Hg) aggressively.
- Never start antihypertensives such as nitroglycerine infusion in suspected head injuries as arterial hypertension is part of protective Cushing's reflex to maintain cerebral perfusion. Labetalol is the drug of choice for control of hypertensive urgency in head injury patient.

Step 2: SECONDARY ASSESSMENT:

- GCS assessment, pupillary assessment & localizing signs (weakness in limbs).
- All patients with GCS ≤ 8 should be intubated and electively ventilated (If not done at step 1).

- Never assume alcohol as the cause of patient's neurological response and delay intubation.

Step 3: ASSESS SEVERITY OF HEAD INJURY:
On GCS grading

- GCS 14 OR 15 – Mild head injury
- GCS 9 TO 13 – Moderate head injury
- GCS ≤ 8 – Severe head injury

Mild head injury
Step A – Shift to observational area
Step B – maintain A, B, C
Step C – send for NCCT head & C – spine (if any neck pain/tenderness)

- Loss Of Consciousness >5min
- Amnesia
- Severe headache
- GCS <15 or,
- Focal neurological deficit attributable to the brain

Step D – Inform Neurosurgeon.

Moderate head injury
Step A – Shift to observational area
Step B – Maintain A, B, C
Step C - - Inform Neurosurgeon.
Step D – Send for plain CT head & cervical spine (All patients to have CT C-spine including C7 vertebrae)

Severe head injury
Step A – Shift to resuscitation room.
Simultaneously inform Neurosurgeon.
Step B - Repeat ABC
Check E- Maintain temperature
Step C –

- Base line blood investigation (Hb%,Hct, platelets, Coagulation profile, RBS, Serum sodium and potassium, Urea, Creatinine)
- Coagulation profile including prothombin time, bleeding time, clotting time & Platelet count should be done in all patients. Special tests like TEG (Thrombelastograph) may be done if available to assess for platelet function.
- Arrange packed RBC or fresh frozen plasma.
- ABG (to be repeated after 1hr)

- Foley's catheterization
- IV fluid maintenance – avoid dextrose containing fluids
- Pantoprozole 40 mg i.v. stat
- Phenytoin sodium IV loading dose of 20 mg/kg, dissolved in normal saline, and infused at a rate no faster than 50 mg/min. Fosphenytoin can also be used at a dose of 20mg/kg and can be infused at a rate of up to 150mg/min.
- 20% mannitol 1gm/kg I.V. stat in 5min. (after Blood pressure (B.P) correction)
- Furosemide 0.3-0.5mg/kg I.V. stat (after B.P. correction)

Step D – FAST to assess any other site of free blood in case of persistent/recurrent hypotension.
Step E - Send for plain CT head & cervical spine ((All patients to have CT C-spine upto C7) on portable ventilator with resident & nurse, with prior information to radiographer and resident Radiology.

Head injury patient kept for observation or waiting admission in Emergency department.

Retriage by staff nurse every Hour assess every 2 hrs).
(In observational area) using AVPU

A – alert
V – verbal responsive
P – pain responsive

U – unresponsive

↓

Inform CMO if deteriorating → Assessment of patient by CMO

Follow up by resident (Neurosurgery resident to

(for both observational resuscitation areas)

↓

If not reviewed by resident inform
Consultant Neurosurgery on call

In case neurosurgical facilities are not available in the hospital, the patient should **NOT** be denied initial assessment & management (Step 1) as these are critical to final outcome. Patient can be transferred to nearest neurosurgical facility after initial management.

Step 4: SHIFT TO ICU
All patients with non-operable lesions and requiring intubation should be shifted **to ICU for further management.**

Step 5: START ANALGESIA & SEDATION

- Sedatives and analgesics can affect outcomes in head injured patients.
- Adequate pain control and sedation can be used as initial measures to control raised intracranial pressure. Short acting agents Fentanyl, Midazolam or propofol are preferred for frequent neurological assessements..
- Propofol infusion and high-dose barbiturate administration is recommended to control elevated ICP refractory to maximum standard medical *and/or* surgical treatment.
- Hemodynamic stability is essential before and during barbiturate therapy.

Commonly Used Sedatives	
Fentanyl	2 mcg/kg test dose 2–5 mcg/kg/h continuous infusion
Midazolam	2 mg test dose 2–4 mg/h continuous infusion
Sufentanyl	10–30 mcg test bolus 0.05–2 mcg/kg continuous infusion
Propofol	0.5 mg/kg test bolus 20–75 mcg/kg/min continuous infusion (not to exceed 5 mg/kg/hr)

- Continuous use may increase risk of ventilator associated pneumonia, hence daily interruption of sedation along with other VAP preventive measures should be used .

Step 6: INTRACRANIAL PRESSURE (ICP) MONITORING

Indications of ICP monitoring:

- ICP should be monitored in patients with GCS ≤8 and an abnormal computed tomography (CT) scan.
- An abnormal CT scan of the head is one that reveals hematomas, contusions, swelling, herniation, or compressed basal cisterns.
- In patients with severe TBI with a normal CT scan if two or more of the following features are noted at admission: age over 40 years, unilateral or bilateral motor posturing, or systolic blood pressure (BP) < 90 mm Hg.
- All children (<12 years) should have ICP monitoring irrespective of CT findings if GCS ≤8

Monitoring Method:

- The ventricular catheter connected to an external strain gauge is the most accurate, low-cost, and reliable method of monitoring intracranial pressure (ICP) with the additional benefit of having a therapeutic role by CSF drainage. However, they carry a higher risk of infection & may be difficult to put in brain swelling with effaced ventricles.
- ICP transduction via fiberoptic or micro strain gauge devices placed in parenchyma are easy to insert, equally accurate, but much more expensivet.

Treatment Target:

- Treatment should be initiated with ICP thresholds above 20 mm Hg.
- A combination of ICP values, and clinical and brain CT findings, should be used to determine the need for treatment.
- Decompressive craniectomy should be considered for persistently high ICP (above 20 mmHg)despite maximal medical therapy.

Step 7. Start Mannitol

In absence of hypotension, mannitol is effective for control of raised intracranial pressure (ICP) at doses of 0.25 gm/kg to 1 g/kg body weight.

- Mannitol is contraindicated in extradural hematoma and should be given only after reviewing CT head & under neurosurgical supervision.
- Mannitol should be ideally used only under ICP monitoring and for not more than 72 hours.

Step 8. INFECTION PROPHYLAXIS & TRACHEOSTOMY

- Plan an early treacheostomy (within 72 hours) for all patients whose motor response is ≤ 4.
- Periprocedural antibiotics for intubation can be considered to reduce the incidence of pneumonia. However, it does not change length of stay or mortality.

Step 9. DVT PROPHYLAXIS

- Intermittent pneumatic compression (IPC) stockings or graduated compression stockings should be used (except in lower limb injuries) and continued till patient is ambulatory.
- Low molecular weight heparin (LMWH) or low dose unfractionated heparin should be used in combination with mechanical prophylaxis when it is safe, preferably after 72 hours of intracranial hemorrhage/ craniotomy with close monitoring and NCCT head to detect expansion of hematoma.

Step 10. SEIZURE PROPHYLAXIS

- Phenytoin (5mg/kg/day) or valproate (15mg/kg/day) should be given for at least a week in all patients.
- Prophylactic use of phenytoin or valproate is not recommended for preventing late posttraumatic seizures (PTS). However, their use in the first week following injury decreases the incidence of early PTS.

Step 11. MAINTAIN NUTRITION

- High nitrogen (≤15 g/day) and caloric intake (50kcal/kg/day) should be maintained. To achieve full caloric replacement by 7 days, nutritional replacement should begun no later than 72 h after injury.

Step 12. OTHER DRUGS/ INTERVENTIONS

- Avoid Steroids.
- Use of steroids is not recommended for improving outcome or reducing intracranial pressure (ICP).

- Use of high-dose methylprednisolone increases mortality and is contraindicated
- Prophylactic mild hypothermia (33- 35 degrees) remains experimental and is not recommended for routine clinical use presently.

Step 13: SURGICAL INTERVENTION

Head Injuries: Decompressive Craniecto*my*

- In case patient continues to have persistently raised ICP (>20mmHg) in spite of maximal medical management, decompressive craniectomy is the only available option to decrease ICP.

MANAGEMENT OF HIGH CERVICAL SPINAL CORD INJURIES

Q: A 50 year old male falls from 20 feet height. On arrival in ED he is conscious, with laboured breathing and no limb movement. His pulse is 52/minute and his BP is 70/40mmHg.

Step 1-2 REMAIN SAME AS FOR SEVERE HEAD INJURIES.

Step 3. ICU CARE

- Management of patients with acute SCI, particularly patients with severe cervical level injuries, in an intensive care unit or similar monitored setting is recommended.

Step 4. BLOOD PRESSURE MANAGEMENT

- Maintain mean arterial blood pressure at 85 – 90 mm Hg for the first seven days following acute SCI as it improves spinal cord perfusion.
- If CVP exceeds 10cm of water, Dopamnine and/or noradrenaline infusion may be given to maintain BP at this level.

Step 5. AVOID STEROIDS

- Routine use of steroids is not recommended in spinal cord injury.

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Step 6. DVT PROPHYLAXIS

- Low dose heparin **in combination with** pneumatic compression stockings for a minimum period of three months is recommended.
- Vena cava filters are recommended for patients who fail anticoagulation or who are not candidates for anticoagulation and/or mechanical devices.

Step 7. CLOSED REDUCTION/ TRACTION:

- Early closed reduction of cervical spinal fracture-dislocation injuries with cranio-cervical traction is recommended for the restoration of anatomic alignment of the cervical spine in awake patients.

Step 8. MAINTAIN NUTRITION

- Nitrogen requirements are the same as in severe head injured patients
- . Caloric requirements may be lower due to muscle paralysis and flaccidity.
- Indirect calorimetry may be more accurate in assessing the caloric requirements in these patients.

Step 9: OPERATIVE INTERVENTION-DECOMPRESSION & FUSION

- All Cervical spinal cord injuries with radiological evidence of cord compression should undergo spinal cord decompression & fusion as early as possible.

SUGGESTED READING

1. Guidelines for management of severe traumatic brain injury. Journal of Neurotrauma. 2007. 24 (supplement 1).

This gives an excellent overview of evidence based head injury management as well as gaps in our knowledge on this subject. A 'must' reading for all those who manage severe head injured patients

Online links

- www.aans.org (Home-Education and Meetings-Clinical Guidelines)

The American Association of neurological Surgeons website has guidelines for both head & spinal injured patients which is freely downloadable.

- https://www.braintrauma.org/coma-guidelines/

This website has useful information on the latest research in head injuries and the outcome of various trials.

Factors contributing to postural displacements in school children

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Abstract

Postural displacements in children could lead to multitude of health consequences. Load carriage by young people has shown to be causing deviations in the implicated body structures. Musculoskeletal pain, lateral deviation of the spine and shoulder level shift are common human afflictions due to postural displacements. This school-based study was carried out in 1361 children selected using a stratified multistage cluster sampling method. Musculoskeletal pain, weight of the schoolbag, lateral deviation of the spine and shoulder level shift were measured. A majority (71.2%) suffered from anytime musculoskeletal pain while 35.9% reported recurrent pain. Thoracic scoliosis was observed in 32 (2.35%) children.No significant difference in any of the four measurements on postural displacements among students of different pain categories was noted. Bivariate analysis showed that thoracic scoliosis was significantly higher among females. Neither school bag model nor bag weight showed no relationship with thoracic scoliosis.

Key words: Postural displacements, children, school, ergonomics

Load carriage by young people has shown to cause postural displacements and musculoskeletal pain (Steele et al. 2003). Such carriage theoretically increases the stresses applied on the spinal structures (Datta and Ramanathan 1971; Deng and Goldsmith 1987; Salminen et al. 1992; Pope et al. 1985; Troussier et al. 1994; Lai and Jones 2001). Troup (1965) postulated that accumulation of minor strains could lead to higher possibility of spinal degeneration resulting in postural displacements. Postural displacements can be considered as both a predictor (Hertzberg 1985) and a consequence (Pascoe et al. 1997) of musculoskeletal pain. Pascoe et al. (1997) described that carriage of schoolbag significantly altered the posture and gait of students to cause musculoskeletal pain. Schoolbag carriage has shown to result in a shift of upper trunk and shoulder and to increase musculoskeletal pain in children (Korovessis et al. 2005). Lateral deviation of the spine (scoliosis) is prevalent in Sri Lanka (Corea 1991). Lateral distortion of the spine relates directly to transverse rib cage deformity within the transverse plane. If the school children have to carry heavy loads for a long period of time, it can lead to spinal deformities such as scoliosis, kyphosis or lordosis (Choice 1986). Knowledge on load-carriage-induced postural displacements and their potential to produce musculoskeletal pain are useful to formulate preventive strategies (Steele et al. 2003).

A study was carried out among school children of 11 -13 years age group in the district of Gampaha. A stratified multistage cluster sampling method was applied in selecting the study population.

A validated pain tool, Adolescent Musculoskeletal Pain Questionnaire (AMPAQ), was administered to measure the prevalence of musculoskeletal pain in four pain categories; anytime, acute, one-time and recurrent pain. Weight of the school bag carried by the participants was measured with a digital weighing scale.

Four selected variables shoulder shift in degrees, shoulder shift in millimeters, lateral deviation of thoracic spine and lateral deviation of lumbar spine were measured in 1361 students who participated in the musculoskeletal pain prevalence survey.

Lateral deviation of the spine is defined as a significant rotation in the normal vertically straight line of the spine (thoracic or lumbar) to either side. Deviation to left is considered as (-) and to right as (+) and measured in degrees.
Shoulder level shift is defined as a tilt in the level of the shoulders in degrees or millimeters. Tilting to left is considered as (-) and to right as (+).

Shoulder level shift was measured using both OSI Scoliometer (Orthopedic Systems Inc, 1897 National Avenue, Hayward CA 94545, USA) and Sabia's scoliometer. Shoulder level shift was measured to the nearest 1 degree and to the nearest 1 mm.

Lateral deviation of the spine (thoracic and lumbar) was measured using OSI Scoliometer to the nearest 1 degree.
Sabia's scoliometer was calibrated against a metal ruler before each data collection session.
Adequately trained Public Health Inspectors and Public Health Midwives measured the bag weight. All the postural displacement measurements were done by the principal investigator.

Results:
The prevalence of anytime musculoskeletal pain among school children was 71.2%. Prevalence rates for acute, one-time and recurrent pain categories were 19%, 16.2% and 35.9% respectively.

Mean values of the selected measurements were compared between students of different pain categories (Table – 1).

Table – 1
Means and the SD of postural displacements among pain categories

Postural Displacement measurement	No pain (N=392)		Acute pain (N=255)		One-time pain (N=219)		Recurrent pain (N=494)		Significance
	Mean	*SD*	*Mean*	*SD*	*Mean*	*SD*	*Mean*	*SD*	
Shoulder shift in degrees	0.17	1.06	0.17	0.93	0.18	0.95	0.07	1.01	F=1.13 p=0.33
Shoulder shift in mm	3.48	4.38	2.95	4.30	3.02	4.10	3.00	4.03	F=1.28 p=0.28
Lateral deviation of thoracic spine	-0.68	1.62	-0.78	1.73	-0.53	1.46	-0.62	1.49	F=1.16 p=0.33
Lateral deviation of lumbar spine	0.38	1.31	0.38	1.44	0.56	1.61	0.46	1.54	F=0.90 p=0.44

There was no significant difference in any of the four measurements on postural displacements among students of different pain categories (Table – 1.

For lateral deviation of the thoracic spine, the scoliometer cut off value for referral is 5 degrees for further investigation for thoracic scoliosis (Song and Herring 1993). Only 32 (2.35%) students were found to have exceeded this value. No standard cut-off values are available for shoulder level shift.

The number of subjects that showed 'abnormal' values could only be assessed in respect of deviation in the thoracic spine.
Considering those who showed a lateral deviation of the thoracic spine as "cases", an attempt was made to carry out an analysis using a case-control approach. As the number of positive cases was only 32, it was decided to include 4 controls per case (Hennekens andBuring1987).

The controls were selected by using random numbers from among those who did not have a lateral deviation of the thoracic spine. Selected variables were included in the bivariate analysis. The main findings are summarized in Table – 2.

Table – 2
Summary Information on relationship between probable thoracic scoliosis and selected variables

	Cases		Controls		Total		Significance	OR (95%CI)
	N	%	N	%	N	%		
Pain category								
No pain	7	14.6	41	85.4	48	100		
Acute Pain	13	30.2	30	69.8	43	100	$\chi 2$=3.996	
One-time Pain	3	16.7	15	83.3	18	100	df=3	
Recurrent Pain	9	17.6	42	82.4	51	100	p=0.262	
Total	32	20	128	80	160	100		
Sector								
Urban	8	17.4	38	82.6	46	100	$\chi 2$=0.275	0.79 (0.33-1.91)
Rural	24	21.1	90	78.9	114	100	df=1	
Total	32	20.0	128	80.0	160	100	p=0.600	
Sex								
Female	24	26.4	67	73.6	91	100	$\chi 2$=5.358	2.73 (1.14-6.53)
Male	8	11.6	61	88.4	69	100	df=1	
Total	32	20.0	128	80.0	160	100	P=0.021	
Age Group								
11 yr	1	6.3	15	93.8	16	100	$\chi 2$=13.118	
12 yr	3	6.1	46	93.9	49	100	df=2	
13 yr	28	29.5	67	70.5	95	100	p=0.001[a]	
Total	32	20.0	128	80.0	160	100		
Bag Model								
Backpack model	26	20.0	104	80.0	130	100	$\chi 2$=0.000	1.0 (0.37-2.70)
Other models	6	20.0	24	80.0	30	100	df=1	
Total	32	20.0	128	80.0	160		p=1.00	
Bag weight as a % body weight								
> 10% bodyweight	15	16.1	78	83.9	93	100	$\chi 2$=2.08	0.57 (0.26-1.23)
< 10% bodyweight	17	25.4	50	74.6	67	100	df=1	
Total	32	20.0	128	80.0	160	100	p=0.149	

Of the variables selected, occurrence of probable thoracic scoliosis was significantly higher among females. However, similar association seen with increasing age has to be interpreted with caution due to small numbers. Neither bag model nor bag weight showed no relationship with thoracic scoliosis.

Discussion

Four selected variables; shoulder shift in degrees, shoulder shift in millimeters, lateral deviation of thoracic spine and lateral deviation of lumbar spine, were of minor degree and showed no difference between different pain categories. This finding is in par with results of Steele (2003) who also showed that only larger postural displacements in unloaded position increased the likelihood of causing pain. All the measurements were taken in the unloaded position in the present study. Even though there are many other measurements related to postural displacements and only four

measurements feasible under field setting were included in this study. Ideally EMG testing should be done to investigate the causes of spinal alterations due to load carriage (Wong and Hong 1997). One of the major limitations of usefulness of measurements on postural displacements is non-availability of standards.

In the present study, 2.35% students were found to have exceeded the referral cut-off for thoracic scoliosis. Wijesekara and Nugegoda (1995) have also found a prevalence of 1.8% of scoliosis following a school screening survey of 2042 children. Prevalence in other countries also vary between 3 – 10% (Wijesekara and Nugegoda 1995). Comparison of selected variables among those with probable thoracic scoliosis with a 'control group' indicated that this scoliosis was higher among females. There was also an indication that an increasing tendency for scoliosis to occur was observed with increasing age and mismatched seat height –buttock popliteal length. Early detection of lateral deviations is important since it enables conservative management (Corea 1991).

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A case of sign of four: revisiting Sherlock Homes

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A 50yr old man brought to the Emergency unit THK around 10 pm with a stab wound on his right chest. On admission his GCS was 3/15 and blood pressure was 110/80 mmHg and pulse rate was around 90bpm. Patient was also found to have engorged neck veins with a swelling on the right neck. According to the story patient was vomiting copious amount of blood. His cloths were found to be soaked with blood and there were lot of blood found on the transport trolley as well. About 10 minutes after the admission patient started desaturating and immediately intubated. Soon after intubation saturation became normal. However at the same time blood pressure started dropping.

While intubating, MO found that there was some blood inside the throat without obvious source of bleeding.

What could be the possible causes at this point?

1. Cut injury to great vessels
2. Pericardial tamponade
3. Probable injury to lung with haemo-pneumothorax
4. Probable Head injury

Therefore the medical officer on duty did a FAST scan and found to be negative. Meanwhile patients' blood pressure continued to drop, and the consultant physician at the ETC called to see the pt. He performed the extended FAST scan which was found **to be negative with intact lung. The swelling of the** neck was found to be a haematoma ultrasonographycally and both internal jugulers and t carotids were intact. Further structures were not visualized due to limitation of the USS probe (5MHz micro-convex probe). Therefore the possibilities at this point could not have been any of the above.

What could be the possible causes at this point?

In the absence of possible causes we thought of impossible causes, such as major trauma to a limb, e.g. fracture femur or pelvis, major spinal injury and isolated injury to thoracic sympathetic chain. Thus leaving behind the other possible causes, which again brings us back to the areas of great vessels in the neck and the thorax. How are we going to proceed from here?

This reminds us the famous logic behind Sherloc Holmes theories. "The Science of Deduction "

1. I observe everything.

2. From what I observe, I deduce everything.

3. When I've eliminated the impossible, whatever remains, no matter how mad it might seem, must be sthe truth.2,3

However since the patient went into hemorrhagic shock surgical and the cardiothoracic teams were called and they decided to open up the patient. While in the operating room patient had to be given a large dose of inotropes and vasopressors in order to maintain pressures.

The findings at surgery and sequelae:

There was a 3 cm long lacerated wound about 2 cm superior and medial to the right nipple. On further exploration it was noted that the knife had pierced the chest wall cutting the enominate vain ,part of the trachea and the isthmus of the thyroid. There was a large collection of blood inside the superior mediastinum, sealed off by the surrounding tissues(This was the probable reason as to why the initial ultrasound could not detect the blood collection.)

This case clearly demonstrate some important principles in diagnostic process in western medicine. Let us quote sherloc Holmes;

There are several key words when Holmes characterizes his own method of reasoning.

Method by elimination, method of exclusion

(Q3) "By the method of exclusion, I had arrived at this result, for no other hypothesis would meet the facts." [*A Study in Scarlet*, pt. 2, ch. 7]

(Q4) "You will not apply my precept," he said, shaking his head. "How often have I said to you that when you have eliminated the impossible, whatever remains, however improbable, must be the truth?" [*The Sign of Four*, ch. 6]

[Let me give you a simple example of this method. In the beginning part of *The Sign of Four*, Holmes surprizes Watson by telling him that Watson went to the post-office in order to send a telegram. His reasoning may be put in the following form:

(1) A v B v C (this is already proved from other sources);

(2) -A (from observational evidence);

(3) -B (from observational evidence);

(4) therefore, C (conclusion).

(Let A, B, C mean, respectively, "Watson went to the post-office in order to send a letter"; or "in order to buy stamps or postcards"; or "in order to send a telegram.")

This seems simple and perfectly all right. But Holmes's eliminative method may not be as simple as this, if we want to take into consideration the link between the three premisses and their evidence, which may be probabilistic. Notice that in (Q4), eliminative method is somehow combined with the consideration of probability or improbability.]

Next, it is interesting to notice that Holmes seldom uses the word "induction," when he speaks of his own method. Instead, he prefers the word "hypothesis."

Hypothesis

(Q5) "I have devised seven separate explanations, each of which would cover the facts as far as we know them. But which of these is correct can only be determined by the fresh information which we shall no doubt find waiting for us." [*The Adventure of the Copper Beeches*]

(Q6) "Where is he, then?"

"I have already said that he must have gone to King's Pyland or to Mapleton. He is not at King's Pyland. Therefore he is at Mapleton. Let us take that as a working hypothesis and see what it leads us to." [*Silver Blaze*]

So far, even a layman can understand what Holmes wanted to say. But we need good philosophical knowledge in order to understand the following words:

Analytical reasoning, synthetic reasoning (reasoning backward, reasoning forward)

(Q7) "I have already explained to you that what is out of the common is usually a guide rather than a hindrance. In solving a problem of this sort, the grand thing is to be able to reason backward. That is a very useful accomplishment, and a very easy one, but people do not practise it much. In the everyday affairs of life it is more useful to reason forward, and so the other comes to be neglected. There are fifty who can reason synthetically for one who can reason analytically."

"Most people, if you describe a train of events to them, will tell you what the result would be. They can put those events together in their minds, and argue from them that something will come to pass. There are few people, however, who, if told them a result, would be able to evolve from their own inner consciousness what the steps were which led up to that result. This power is what I mean when I talk of reasoning backward, or analytically." [*A Study in Scarlet*, pt.2, ch.7]

Comments: As you may well know, Cartesian analysis is a procedure like this: given a problem to be solved, we examine the conditions to be fulfilled, and divide them into simpler conditions which are easier to solve (in Descartes' words, "divide each of the difficulties I was examining into as many parts as possible and as is required to solve them best"). We go backward, so to speak, from the given problem to the simpler and solvable constituents. In the preceding quotation, Holmes explains a similar procedure in terms of cause-effect relations; i.e., given a problem consisting of a number of facts (effects), we go backward in search for their unknown causes. (Presumably, Holmes adopted this way of explanation because this was easier for Dr. Watson to understand!)

[By the way, eliminative method and analysis are closely related. We can show this by means of Jevons's idea of logical alphabets. For example, given three propositions A, B, C, we can form logical alphabets in the following way: for each proposition, there are two possibilities, either affirmation or negation; so let us signify the former by a Capital letter, the latter by a lower case letter. And further, let us understand that juxtaposing two or more letters means a logical conjunction. Then, we can express all the possibilities out of these three propositions by the following eight conjunctions, which are Jevons's logical alphabets in this case:

ABC, ABc, AbC, Abc, aBC, aBc, abC, abc.

And these correspond to Descartes's "as many parts as is required to solve them best." The process of reasoning is essentially eliminative in that, given any information, this information eliminates some of the logical alphabets; and what remains after all premises are represented, that is the conclusion.

This process takes place within the framework of Cartesian analysis.][3]

We finally come to the most important key word:
Balance of probabilities

(Q8) "Ah,that is good luck. I could only say what was the balance of probability. I did not at all expect to be so accurate."

"But it was not mere guesswork?"

"No, no: I never guess. It is a shocking habit---destructive to the logical faculty. What seems strange to you is only so because you do not follow my train of thought or observe the small facts upon

which large inferences may depend." [*The Sign of Four*, ch. 1]

(Q9) "We are coming now rather into the region of guesswork," said Dr. Mortimer.

"Say, rather, into the region where we balance probabilities and choose the most likely. It is the scientific use of the imagination, but we have always some material basis on which to start our speculation." [*The Hound of the Baskervilles*, ch. 4]

Scientific use of the imagination

See the last quotation above.

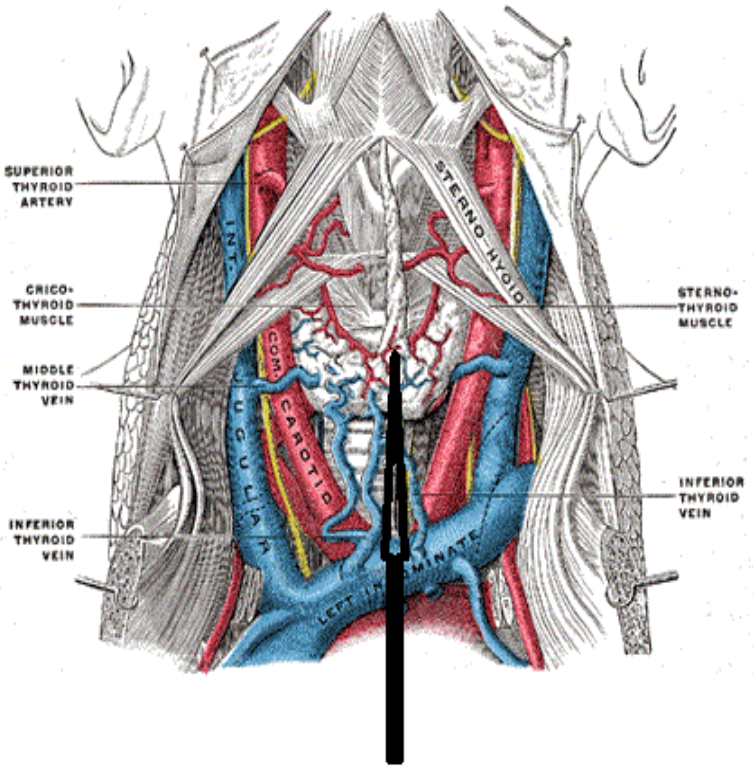
We have to notice that Sherlock Holmes is contrasting his method, which essentially depends on the balance of probabilities, with "mere guesswork," which he despises as destructive to the logical faculty. He is saying that his method is logical and scientific, although it might seem uncertain or unstable to a layman, like Watson or Mortimer.

It should be clear by now, from these examinations of key words, that Sherlock Holmes's method of reasoning has a firmer structure than you might have imagined at first sight. Is there any theory of scientific method which captures all or almost all of these features? Let us next see some of the 19th century methodologists.

Ref: **Soshichi Uchii**, Kyoto University, Japan

At the very beginning if we thought of the most impossible causes we could have at least thought that the patient could have bled from a sight which we could have thought as impossible causes. Therefore reading Sherlock Holmes may make you a great physician!

Approximate pathway taken by the knife as revealed during the surgery



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1. [*The Sign of Four*, ch. 1]
2. [A Study in Scarlet, pt.2, ch.7]
3. Rene Descartes.
4. **Soshichi Uchii**, Kyoto University, Japan

Close Loop Control System in Medical Administration

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Control systems are ubiquitous and are increasingly becoming important. Processes are bound to fail if the control systems do not work as expected. The goal of any control system is to maintain process variables at a desired operating value. Processes are dynamic in nature and occurring of changes frequently is an integral part of it. It is reasonable to assume that important variables such as those related to safety, quality and the production rate will not achieve their targeted status unless there is a proper control system in place. Introducing the concept of automatic process control may manifest dramatic effects on any dynamic system.[1]

The control theory is extensively used in many areas/affairs, (e.g., engineering and mathematics) and it deals with the conduct of dynamic systems. It can be postulated that the original concept of a dynamic system owes much to Newtonian mechanics (Crewell, Benjamin, Newtonian physics). In essence, the measured response of a physical system compared with the desired response, and the difference between the two responses' initiative measures will result in the actual response of the system to approach the desired response.

Control is inherently a multi-disciplinary feature. A typical control system contains sensors, actuations, computers and software. Adequate knowledge about the particular process and good team work is essential in designing a control system, because of the wide range of technologies and techniques involved in its implementation.[3]

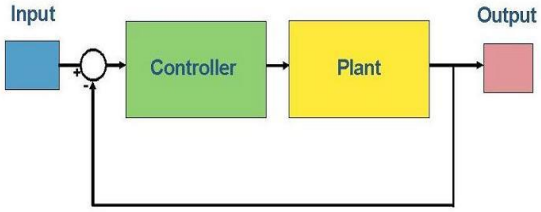
Feedback control is a central feature of life also. All organisms share the ability to sense how they are doing and to make changes in them, if and when necessary. The process of feedback governs as to how we grow (physically and mentally), respond to stress and challenges, and regulate factors such as body temperature, blood pressure and the cholesterol level. [1]

There are two types of process control systems namely, manual process control and automation process control.

There are also two control strategies.

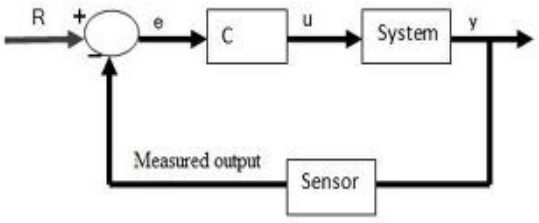
1. Open loop control (feed-forward control)
2. Close Loop control (feedback control), which is used in the processing segment of most industries. However, not having a feedback loop makes it inexpedient with regards to self-correcting.

Figure.1 – Open Loop Control System



The closed loop system is a control system with a feedback loop that is active. This feedback loop takes the system's output into consideration and enables the system to adjust its performance to meet the desired output response.[6]

Figure.2 – Close Loop Control System



Medical administration is a field where several processes/activities take place in order to provide quality health care services. The processes involved in the health care institutions with the aim of ensuring proper functioning are: office management, facility management, supply chain management etc. Unlike in other fields, in the health care sector, failing of one process leads to serious delays in several other activities that ultimately affect the care provided for the patient.

Supply Chain Management

The supply chain in health care administration is a complex process. In such a system, it is necessary to have many buffer storages to correlate with production rates, fluctuating sales, and the

availability of supplies of raw materials and parts from subcontractors. In a process of this nature the close loop system may be the preferred choice, as it produces a feedback system that facilitates to maintain production, procurement and distribution at the desired operational value. Administration of this kind of system greatly simplifies the process and contributes significantly in achieving an efficient supply chain management process as well.[4]

In medical administration, rarely have they thought about a close loop feedback control system. The reason most processes fail or perform poorly is because they are designed with no consideration for dynamics and control.

Control process is an essential element in all fields. It is reasonable to assume that close loop feedback control system may contribute significantly to enable the medical administration to become more efficient in the future. It is high time this vital concept is introduced to the Sri Lankan medical administration.

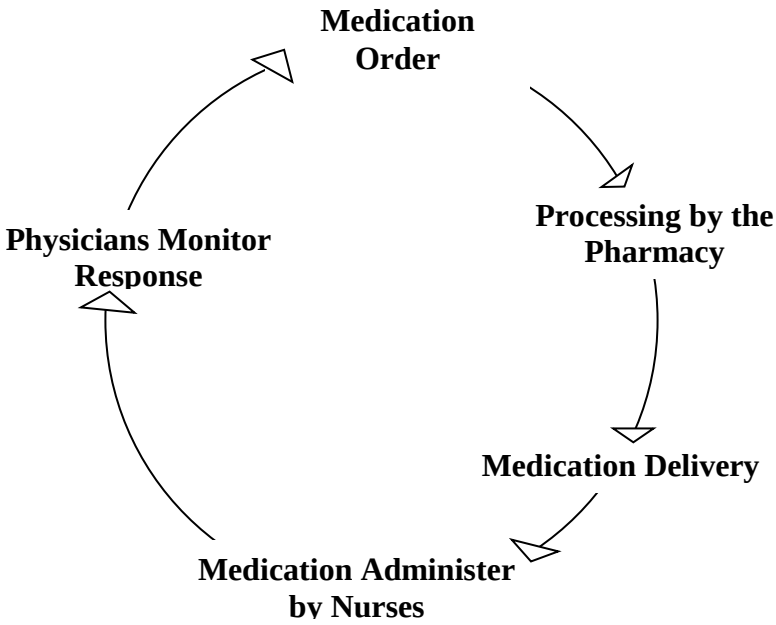
Closed- Loop Medication Management

Another important application of mathematical modelling needs is medication management. It is one of the most complex parts of a hospitals care delivery system .at glance it may appear as a relatively simple process. However it is the en result of an indicated system involving clinicians, various department, different facilities and processes .without full coordination of care among the doctors who orders a drug, the pharmacy that fills the order, the staff that deliver the medication, and the nurse who administers it, the risk of potentially harmful medication errors multiplies.[7]

A truly closed-loop medication System is design to feed outcomes from medication process back into the system to allow for future improvements and changes in patient's level of care.

This can be for the illustrated in the following circular process.

In the light of Current applications of mathematical modelling in medical Administration it is high time that Sri Lankan setup also adapt such a system.



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Fibromyalgia: a neglected disease.

PV De Silva[1]

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Introduction: Fibromyalgia is a chronic disease which is characterized by widespread musculoskeletal pain, reduced pain threshold with the presence of multiple tender points without any inflammatory or structural cause. Other than the pain and tenderness large proportion of patients with fibromyalgia are complaining symptoms such as joint stiffness, sleep disturbances, fatigue, depression, headache, non specific abdominal pain and urinary frequency. Therefore, alternative term, fibromyalgia syndrome also used for this condition [1]. For similar symptoms, many other names such as fibrositis, neurasthenia and muscular rheumatism have been used [2]. In Sri Lanka, some of the doctors use the sinhaleese term "Aege Pathe Rudawa" (abbreviated as APR) for similar symptoms and usually do not recognized this as a disease entity. Some of the physicians consider this as a psychosomatic disorder. Majority of the patients develop this condition after a trauma such as a major surgery or following a viral infection. However, Fibromyalgia symptoms can persist even after the complete cure of the initial condition.

Diagnosis: In 1990, American College in Rheumatology has published a diagnostic criterion for fibromyalgia. These required chronic widespread pain, i.e. pain on both sides, upper and lower parts of the body and in the axial skeleton for at least 3 months, and presence of tenderness at 11 or more of 18 specific sites [3]. Tender points are illustrated in Figure 1. In most of these patients, EEG identifies disturbed stage 4 sleep. Fibromyalgia is now considered as a genuine disease and it has classified in the ICD 10 classification under the musculoskeletal problems with the code of M79.7.

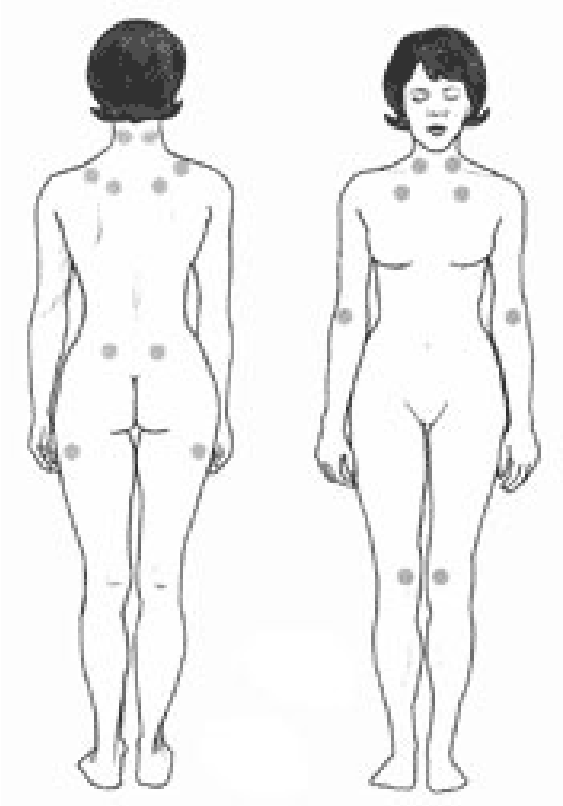

Figure 1. Sites of the 18 tender points.

Epidemiology: Prevalence of fibromyalgia in the USA was reported as 2% [4] and in Canada as 3.3% [5]. However, in Scandinavian countries such as Denmark and Sweden it was reported as 0.7% [6]. It is found to be a common problem among the attendees to rheumatology clinics and usually amounts 10 – 20% of new visits [3]. Studies have consistently identified the female predominance in this disease [4-6]. Male to female ratio was reported as 1:9 [7]. Older age and low level of education also associated with this disease [8]. Author was unable to identify the prevalence of fibromyalgia in Sri Lanka or any other south Asian country due to unavailability of studies.

Aetiology: Exact aetiology of fibromyalgia is still unknown. However, fibromyalgia was found to aggregate among family members [9]. Studies conducted using twin registries found that monozygotic twins had 15% chance to get fibromyalgia if their twin has this disease. And this was reduced to 7% in dizygotic twins [10]. Above findings suggest a genetic predisposition to the development of fibromyalgia. However, scientists were failed to describe the mode of inheritance. Psychological factors such as depression, post traumatic stress syndrome and chronic fatigue syndrome were found to be associated with fibromyalgia [11,12]. Reduced Growth Hormone

secretion [13], insufficient Dopamine in the body [14] and abnormal serotonin metabolism [15] also suggested as the cause of fibromyalgia by different researchers. However, their role is still debatable.

Treatment: A large number of different therapies for fibromyalgia have been described in the medical literature. They include, drug therapy, behavioral therapy, cognitive therapy, physical therapy and life style changes. The European League Against Rheumatism (EULAR) has appointed a group of 19 experts representing 11 European countries in the field of fibromyalgia and they had reviewed the available evidence on the management of this problem. They had a very comprehensive systematic search *using Medline, PubMed, EmBASE, PsycINFO, CINAHL, Web of Sciences, Science Citation Indices, Cochrane Central Register of Controlled Trials* and prepared the guidelines for the treatment of fibromyalgia in 2008 [16]. This guideline consists of nine specific recommendations under three broader headings; general, non pharmacological management and pharmacological management [16]. Most of the above recommendations were based on the available evidence by way of randomized controlled double blind trials, randomized single blind trials and non randomized open trials. However, some of the recommendations were based on the expert opinion.

Under the general recommendations they recommend a comprehensive assessment of pain, function and psychosocial context. For the optimal treatment they recommend pharmacological and non pharmacological treatment modalities tailor made according to the severity of pain, functional disability and other associated symptoms such as sleep disturbance and fatigue. Decisions should be made after an in-depth discussion with the patient.

Under the non pharmacological methods they recommend tailor made exercise programmes to the patients such as aerobic exercise and strength training. Heated pool treatment was found to be effective for these patients. However, availability and affordability of such facilities are very much limited in a country like Sri Lanka. Cognitive behavioral therapy was found to be effective among some of these patients. They further recommend alternative therapies such as rehabilitation, physiotherapy, relaxation and psychological support according to the requirements of the individual patients [16].

Under the pharmacological management mainly the Tramadol was recommended for the pain relief of fibromyalgia. Paracetamol or weak opioids also can be used with or without Tramadol as and when required. However, strong opioids or corticosteroids were not recommended. Antidepressants can reduce the pain and improve the function of fibromyalgia patients. Therefore, antidepressants such as *amitriptyline, fluoxetine, duloxetine, milnacipran, moclobemide and pirlindole were* recommended in the management [16].

However, due to the chronic nature of this disease and partly due to the lack of knowledge of physicians about this disease and its management, large proportion of patients even in the developed world try complementary and alternative methods for the treatment of fibromyalgia [17]. De Silva *et al* performed a systematic review on the efficacy of complementary and alternative medicine in the management of fibromyalgia using the randomized controlled trials published up to the end of first quarter in 2009 [18]. According to that systematic review only Homeopathy was found to be effective for fibromyalgia. However, this also based on the evidence from three small randomized controlled trials [19-21]. They failed to identify consisting evidence regarding the efficacy of anthocyanidins, capsaicin and S-adenosylmethionine.

Fibromyalgia is not a life threatening disease. However, the pain and disability associated with this disease can have an impact on every aspect of patient's life including their employment and their social interactions. And it can significantly reduce the quality of life of those affected. Therefore, it is a responsibility of the health care provider to identify this as a genuine disease and try to manage using the available resources to get these patients back to their normal life.

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‘Critical Care and other Anecdotes- Current relevance?’

Prof.Arjuna Aluwihare

It is a privilege to be invited to contribute unconnected memories to the first issue of what will become a leading journal in helping the care of critically ill patients.

In 1963 while an Intern in Ward 4 of the General Hospital in Colombo (on Kynsey Road/Regents Place) a young Buddhist priest who had tetanus (not seen now thanks to the efforts of the often forgotten Family Health workers) had a laryngeal spasms and respiratory arrest. The Nurses gave me the instruments and help to do a tracheostomy on him in his bed- and he was looked after (he could breath after that) by the Nurses and Labourers- no students in the appointment then and no bystanders- and survived. After more verbal contact and discussion when I married the main nurse who assisted then, in 1966, Dr. Noel Bartholomeusz (it was his ward) and his wife came to the wedding- the priest must have been in his temple.

During a ward round during the next intern appointment with Prof CC de Silva and Dr Gomez in attendance a 2 year old with laryngo-tracheo-bronchitis arrested in front of us- that time a razor blade broken longitudinally in half and a pair of mosquito forceps helped open the trachea in the cot, and hold it open till tubes etc. arrived. (Prof CC was unmoved by all this but allowed it). The baby, who could then breathe and demand food etc. by gesture was moved to a side room and cared for by the medical students (suckers and such like, i/v fluids at first with the rate written on a plaster stuck vertically on the drip bottle) - 2 at a time 24 hours day and night for a week- and then the tube was removed and in due course the kid left- and must have grandchildren of its own by now. Later a diphtheria child in a worse situation died after a tracheostomy in theatre from a cardiac event.

In the mid 1970’s in Kandy Hospital a theater nurses sister got tetanus after an illegal abortion and arrested unexpectedly in the ward after bad laryngeal spasm- I was now a young Senior Lecturer and had the stuff to do a tracheostomy in the ward but she kept getting bad spasms- we moved her to the area outside the theatre next to the nurses changing room and in the ward first and then there she was hand ventilated for over a week by the medical students- two at a time 24 hours day and night (and on one Christmas night at 1.30 am a student who was found missing came for a long chat the next day!) and survived- but she had another illegal abortion later without getting tetanus again! The students kept very good pulse BP and other charts by touching the patient at regular intervals- no monitors. In gratitude the theater staff member organized a lunch at our house in Kandy for the whole batch of students, and we staff as well- this was before the second illegal abortion.

In 2003 at the inaugural oration of the South Asian Association of Regional Cooperation surgical Care Society (SAARC SCS) meeting in Kandy I had a 17 year old dancer perform half way- shock to all- she had had gastroschisis at birth (that is all the abdominal contents out through the true umbilicus) - this was repaired under GA by creating a large ventral hernia to cover everything- and that was closed 7 years later. After the first operation she was hand ventilated for over a week by the medical students (I cannot remember in ward or outside the OT) in an incubator with hot water bottles- 24 hours day and night till she could breathe- over a week, with careful charting –no monitors. She is now training to be a dancer.

In England in 1979 a leading paediatric Surgeon who was in Liverpool when they got their first Paediatric ICU told me the mortality dropped by 75%; what their ICU had was cots with hot water bottles, hand operated stuff, no monitors, no burettes, but they had a nurse at each cot 24 hours day and night.

Why these anecdotes? Many of the Nurses and students have in later years reminded me of the value of participating in such active care although at the time it seemed a curse- quite apart from the fact that in those days these patients would have died without the students/ staff very active and close involvement. I worry that this close student hands on involvement might get less even in the wards and ICUs and they miss a chance to maximize and realize their own clinical abilities and ability for self-learning! Having said this- I must add that at least the current crop of surgeons are generally much better than we were at their age!

A few years before this before this one day I found in the ICU the charts being maintained without touching the ventilated or ill patients pulses (i.e. the wrist) and cut the monitor leads- and was hauled up before the Director. My excuse was that when the patients were touched other information was available such as skin/axillary temperature ration, moisture,- other than just the numerical figure and that the monitors were not meant to isolate patients from the clinical staff (nurses or doctors) - fortunately a company friend replaced the leads without my having to pay for them!

The kind of equipment available in hospitals has changed for the better- my concern is not that it

should be ignored but that enhanced and existing clinical skills enhance the value of equipment and monitor misuse and failure. The same applies to investigative equipment e.g. for imaging- one worries that automatic and thought less use of such can mislead clinicians. I well remember an instance where an obvious tumour was missed on a CT and on the PET scan, which PET scan at the same time had false positives- only careful clinical intervention prevented a disaster for the patient. The clinicians' five senses and brain must remain an increasingly valuable resource.

Around this time also one day in the corridor outside the ICU a consultant said that the load of poisoning patients was unbearable- my reply was that without such a large load the chance to see something 'outside the box' may not come. Fairly soon after this the famous paper on the Intermediate syndrome after organo-phosphorus poisoning was snapped up by the New England Journal of Medicine- and is now famous- that Consultant was one of the authors.

Some year earlier when the Peradeniya Hospital was coming on stream we were in a group which had to choose whether to get more ventilators or use the money to get refrigerators so that the vaccine cold stream could be maintained island wide- we chose the 'fridges! Now our immunization rate is so high thanks to the family health workers that if a tetanus patient appears people will collect from far and wide (in 1971 we had up to 3 each casualty day)

Personal benefits also accrue- childrens' necrotizing enteritis suddenly became very common about 20 years ago and we (us and nurses and students) were quite careful with them. When our Doberman pup got the same illness we knew how to look after it at home- wife and a daughter stayed awake at night- and believe or not the pup did not touch the drip till one day when we decided to remove it we turned round to find the pup had come to the same decision and had removed the cannula!

What about other aspects of students and young postgraduates? They may well have felt neglected as I was missing often but there were colleagues in the Department who more than made up for this. Students were expected to 'clerk' holistically all their own patients and meet the relatives, (between 10 and 20 patients each) and then explain the main features of their patients to all their group in the batch. Thus the whole batch found about the main clinical and other information of about 500 patients. They were expected to read about all this before coming the next morning. If any student did not know about another ones patient- the actual 'owner' was reprimanded- this was partly not to allow 'kada'- little groups of like-minded and socially similar students from 'clubbing' together- to interfere with learning of the whole group. The reprimand might involve doing an extra two weeks in a hospital near the student's home (with appropriate letters to that hospital). Some came back from such experiences saying that the patients often asked them for advice as the patient felt they (the students) were more up to date than the consultants as they (the students) were fresh from the teaching hospital unlike the 'older consultant'! Lecture attendance at that time was not compulsory. Some of the students of those eras felt some of us did not teach them any surgery- but helped them learn how to deal with difficult situations/ people.

One of the other 'odd' events experienced by some was the tea in our house- they brought bread and tea- and sugar if they wanted it. The cow was milked while they watched and they got milk, and butter and cream cheese made earlier from the milk, and marmalade made from the tree at home. These 'surgical 'skills arose from the fact that for the first seven years in the Department there was no private practice and we found we could run cows at a profit provided we could do all the work (we means eventually whole family- the last cow left in about 1993 when our last child left school). Critical care was involved in delivering cows in obstructed labour of live calves during JVP curfews with the Veterinary clinical staff on the telephone and our hands deep in - - - -.

These notes are obviously relatively personal. One cannot end without paying tribute the many patients and their relatives (several of whom one meets in the street even now) who provided the opportunity to work in the government/ university sector; the many under and postgraduate students, the many nurses, ward attendants, and other ancillary hospital staff and younger and senior colleagues without whom nothing would have been possible and who did an enormous and often unrecognized workload- and continue to do so today. You must be able to imagine the support from my immediate family members for supporting the 'background' which made the events in these notes possible.

The First World War and its influence on the development of orthopedic surgery

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Abstract

By December 1914, overwhelming numbers of soldiers with infected musculoskeletal wounds had filled hospitals in France and Britain. Frequently initial management had been inadequate. In 1915, patients with orthopaedic wounds were segregated for the first time when Robert Jones established an experimental orthopaedic unit in Alder Hey Hospital, Liverpool. In 1916 he opened the first of 17 orthopaedic centres in Britain to surgically treat and rehabilitate patients. Henry Gray from Aberdeen emerged as the leading authority in the management of acute musculoskeletal wounds in casualty clearing stations in France and Flanders. Gray had particular expertise in dealing with compound fractures of the femur for which he documented an 80% mortality rate in 1914–15.

keywords compound fracture of femur, First World War, Henry Gray, Robert Jones, orthopaedic surgery

Declarations of Interests No conflicts of interest declared.

Following the outbreak of the First World War in August 1914, medical services in France and Flanders were confronted by huge numbers of soldiers with grossly contaminated musculoskeletal wounds.

These men were evacuated by a designated pathway to base hospitals, where they underwent definitive surgery (Figure 1). Many lives were lost as a result of this policy. It took too long to reach base hospitals and organisms responsible for causing gas gangrene had an opportunity to thrive.

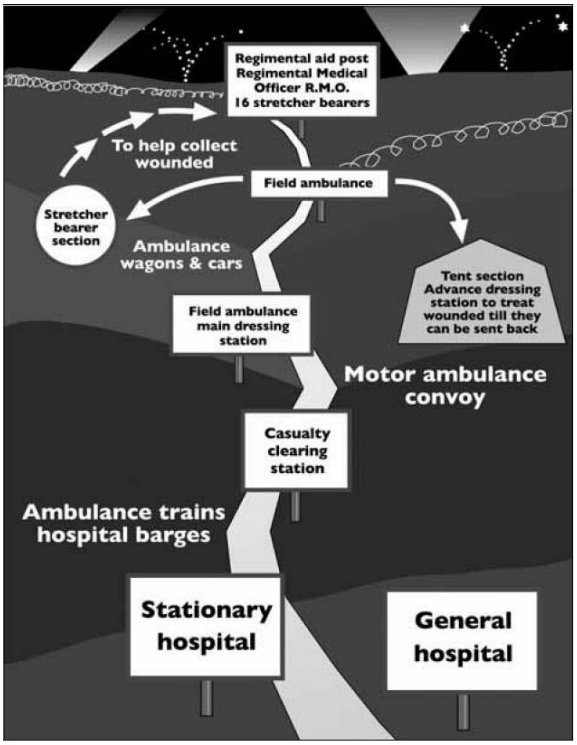

FIGURE 1 Evacuation pathway for casualties from point of wounding to base hospitals (Gordon Stables, Department of Medical Illustration, University of Aberdeen).

Evacuation pathway and its modification

Each battalion of approximately 1,000 officers and men had a regimental medical officer who administered medical care to the sick and wounded. Sixteen regimental stretcher bearers retrieved the wounded from No Man's Land and transported them to the Regimental Aid Post close to the front line, where they were given basic treatment before a field ambulance took over their care.

Table 1 Causes of wounds sustained in 24 hours during the T
September 1917

Wounding agent	No. of wounds	Percentage
High explosive	3,867	35.8%
Shrapnel	2,142	19.9%
Bullet	2,933	27.2%
Hand grenade	77	0.70%
Bayonet	17	0.16%
Gas	209	1.94%
Uncertain	1,544	14.3%
Total	10,789	100%

From: MacPherson WG, *History of the Great War based on official documents*, p.170–1.[3]

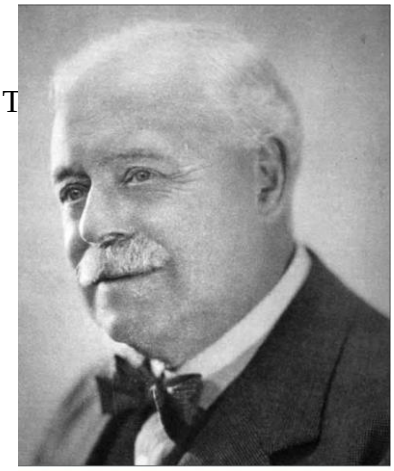

FIGURE 2 Sir Robert Jones (Private collection).

Figure 2 Sir Robert Jones (Private collection).

A field ambulance was a medical facility positioned roughly two miles from the front line. It had a tent division and a stretcher bearer division. Three field ambulances were allocated to an infantry division of approximately 12,000 men.The tent divisions of the ambulances pooled resources to establish an advanced dressing station (ADS) and main dressing station (MDS) to treat the wounded, while the stretcher bearer divisions collected the wounded and transported them from the Regimental Aid Post to these locations. Each ambulance was made up of three identical From the ADS,patients were transported to the MDS or sections capable of independent action. Surgery was performed infrequently at ADSs during the early years of the war, although by 1918 experienced surgeons performed life – saving surgery in these forward position.' From the ADS, patients were transported to the MDS or to casualty clearing stations (CCSs), depending on the severity of their wounds. Casualty clearing stations were usually out of range of shell fire, at a minimum of 10,000 yards from the front line, and could be reached relatively quickly by motor ambulance convoys. They were usually constructed from pre-fabricated wooden huts, in close proximity to a railway. Their purpose was to clear casualties by hospital train to base hospitals for surgery.

Because of the problem of gas gangrene caused by delay in surgical intervention, Sir Anthony Bowlby, Senior Consulting Surgeon to the British Expeditionary Force, stated that patients with filthy wounds had to have definitive treatment as soon as possible after the infliction of the wound, because gas gangrene could become widely spread within 24 hours. It was necessary to operate on such cases before patients were sent by train to the

base.[2]

Casualty clearing stations were chosen to perform this surgery. During the Third Battle of Ypres (31 July–10 November 1917), CCSs performed 61,423 operations, or 30% of definitive surgical procedures.[3]

The personnel at a CCS normally comprised eight officers and 77 other ranks. One of the medical officers had dental qualifications. Nursing sisters were added in 1915, at first five and then seven. A CCS had two surgical teams during quiet spells, consisting of a surgeon, anaesthetist, theatre sister and an operating theatre orderly. When reinforcements were required during a battle, surgical teams were sent from tent sections of field ambulances, from other CCSs in quiet locations and from base hospitals.

Casualty clearing stations closest to the front treated those patients in greatest need. Soldiers with abdominal wounds, chest wounds and compound fractures of the femur came into this category. Clearing stations could accommodate 800–1,200 patients and three or four with similar designated expertise were grouped together so that 'on call' could be passed from one to another.

Wounded soldiers were assessed by an experienced surgeon. Those with severe wounds, considered safe to wait a few hours, were put on hospital trains and sent immediately to base hospitals for surgery. Those with minor wounds were admitted for surgery in a minor operating theatre. All devitalised tissue was thoroughly excised. Most of these men could be returned to duty relatively quickly. Men with wounds requiring immediate limb- and life-saving surgery underwent treatment at the earliest opportunity at CCSs in operating theatres equipped to deal with major cases.

Artillery fire caused the greatest number of casualties in the First World War. Fragments of high explosive shell or shrapnel balls were responsible for 58% of wounds in a series of 212,659 cases.[4] Rifle and machine gun bullets were responsible for 39% of wounds, while hand grenades caused 2.19%. Bayonet wounds were conspicuous by their absence and were only responsible for 0.32% of admissions, either because they did not occur or else were usually fatal and rarely reached medical services. In a 24-hour 'snapshot' during the Third Battle of Ypres, there were 10,789 admissions to CCSs on 21 September 1917 (Table 1).[3]

August 1914, Liverpool surgeon Robert Jones (1857– 1933) joined the reserve as a captain and was attached to the 1st Western General Hospital at Fazakerley, Liverpool. Jones (Figure 2) was quickly promoted to the rank of major and one of his duties was to visit hospitals of Western Command. Like all British surgeons, Jones was a general surgeon, but he had extensive experience in musculoskeletal surgery. The Welsh medical practitioner Hugh Owen Thomas (1834–91) was his uncle by marriage, and Jones lived with Thomas from the age of 16.

Thomas was an innovative, eccentric practitioner who wrote extensively but never appended his medical qualification to published work and never held a hospital appointment. Many thought that Thomas, like his forebears, was an unqualified bone-setter. His patients were the poor and the destitute living around the docklands of Liverpool.

Many suffered from tuberculosis and joint disease was common. Thomas had a workshop in his premises at 11 Nelson Street, Liverpool, where he invented many splints, including one to immobilise knee joints affected by tuberculosis.

Jones studied medicine at Liverpool and became a Fellow
Surgeons of Edinburgh. Unlike his uncle, Jones was very
surgeon-superintendent to the Manchester Ship Canal, bui
A total of 20,000 workmen were employed in its construct
than 200 major injuries.[5] This experience would stand him
World War.

FIGURE 3 Sir Henry Gray (Courtesy of Dr Ian Levack).

After completing his inspection of hospitals in 1914, Jones wrote a damning report that reached Director General of Army Medical Services, Sir Alfred Keogh. Jones highlighted large numbers of soldiers with musculoskeletal wounds who had been passed from one hospital to another to free up beds and who had been treated badly. These crippled soldiers were neither fit for military duty nor for return to civilian life.

Sir Berkeley Moynihan from Leeds was one of the most influential general surgeons at the time. Before the war he had established the Provincial Surgeons' Club to bring together surgeons who practised in 'the provinces' (which for practical purposes meant outside London!); Jones was a founder member. Moynihan admired Jones, often referring to him as 'Grandpa'. Moynihan visited hospitals in France between December 1914 and March 1915 and declared that the treatment of compound fractures was deplorable. The country would soon be 'flooded by men doomed to deformity and crippling'.[6]

As a result of the reports submitted by Jones and Moynihan, Keogh invited Jones to open an experimental orthopaedic unit in Alder Hey, Liverpool, in the spring of 1915, segregating patients with orthopaedic wounds for the first time. In total, 250 beds were allocated; this quickly increased to 560.[5]

The Alder Hey unit was so successful that Jones opened the first orthopaedic centre on the site of the Hammersmith Workshop at Shepherd's Bush in London in March 1916. This centre fulfilled two roles. First, orthopaedic problems such as non-union, mal-union and peripheral nerve injuries, all complicated by sepsis, were dealt with surgically. Second, facilities to rehabilitate soldiers were provided. They were given an occupation in a 'curative workshop' which helped to improve function and to restore morale. Soon there were 17 orthopaedic centres around the UK, including three in Scotland: one at Old Mill Hospital in Aberdeen, better known to-day as Glenburn Wing, Woodend Hospital; a second at Bangour Hospital near Edinburgh, which specialised in the management of peripheral nerve wounds; and a third at the site of the Red Cross Hospital in Bellahouston Park in Glasgow. Three quarters of patients admitted to orthopaedic centres returned to some form of military activity.[5]

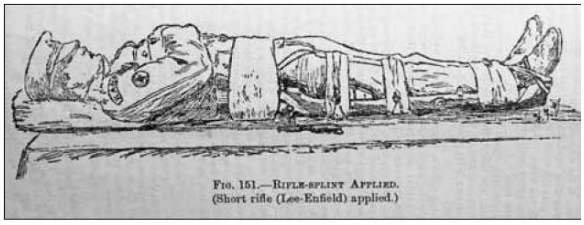

FIGURE 4 Rifle Splint; from Royal Army Medical Corps Handbook, 1911; a Lee-Enfield Rifle was strapped to the affected limb and to the pelvis. It was not effective in immobilising the fracture.

These developments were frowned upon by London-based surgeons, who believed that surgical innovation could only take place in London. The president of the Royal College of Surgeons of England, GH Makins, stated:

We find a specialist for the treatment of fractured jaws; another for fractures of the thigh; and third, strange inconsistency, we meet a third department, that of orthopaedics – for which a special course of a few months in some instances suffices to qualify – claiming almost the whole field of the surgery of injuries.

Jones was made Director of Military Orthopaedics in 1916 by Sir Alfred Keogh as a result of sustained pressure by Moynihan. Keogh knew he would face opposition from London surgeons, stating that they would have his head on a charger![6] Moynihan told Keogh that unless Jones was appointed Director of Military Orthopaedics, then he, Moynihan, would resign.[6] Not only was Moynihan influential in Jones' appointment, he was also powerful enough to keep him in post, fending off unwelcome attention from the surgical establishment. Jones dealt mainly with the late sequelae of frequently mismanaged orthopaedic wounds. He also made a vital contribution to the management of the most severe orthopaedic wound on the Western Front,the compound fracture of the femur caused by bullet or shell fragment, by introducing the Thomas Splint to deal with this problem. He was encouraged to do so by his friend and colleague Henry Gray (Figure 3) who was emerging as the leading authority in musculoskeletal surgery in CCSs serving the Western Front.

Gray (1870–1938) was born in Aberdeen, the son of a wholesale provision merchant.He studied medicine at the University of Aberdeen, graduating in 1895. He became a Fellow of the Royal College of Surgeons of Edinburgh, was appointed assistant surgeon to the Royal Infirmary of Aberdeen in 1899 and consultant surgeon in 1904, a position he held until the outbreak of the war in 1914. He is credited with bringing aseptic surgery to Aberdeen and local anaesthesia to surgery in Great Britain.[8] Gray, like Jones, was one of the founding members of Moynihan's Provincial Surgeons' Club.[9] He spent three and a half years in France during the First World War, first as Consulting Surgeon to a group of base hospitals in Rouen, then Consulting Surgeon to the British Third Army.

At the outbreak of war, the Royal Army Medical Corps (RAMC) employed a modified Liston Splint to immobilise fractures of the femur. The Edinburgh surgeon Robert Liston (1794–1847) had been an important establishment figure in London in the nineteenth century. He left Edinburgh because he was very unpopular with his colleagues for abrasive and argumentative behaviour and became Professor of Surgery at University Hospital London in 1835. He was noted for his speed of surgery, amputating a leg in a few minutes, although on one occasion he allegedly inadvertently removed the patient's testicles at the same time. Liston developed a splint for immobilising fractures of the femur, which was a long pole extending from axilla to foot, strapped to the patient's trunk and limb.The RAMC employed a similar 'Rifle Splint' (Figure 4).

The Rifle Splint was not fit for purpose as it failed to immobilise the fracture. By the time patients were transported to CCSs, most were moribund from excessive blood loss and unfit to withstand radical excision of contaminated and devitalised tissue, which was necessary to save limbs and lives. Gray documented the mortality of compound fractures of the femur in 1914 and 1915 to be 70–80%.[10]

Gray encouraged Jones to use the Thomas Splint, which was similar to the one shown in Figure 5. Skin traction apparatus was attached from groin to ankle. Cords tied under tension round the bottom of the splint maintained longitudinal traction, overcoming muscle spasm in the thigh and maintaining good fracture alignment. Movement between bone ends at the fracture site was diminished and blood loss was reduced. The majority of patients reached CCSs haemo-dynamically stable and able to withstand major surgery.

By 1917, Gray was Consulting Surgeon to the British Third Army and responsible for administering surgical care to its soldiers when it attacked at the Battle of Arras on 9 April 1917.The battle lasted six weeks during which time 1,009 compound fractures of the femur were admitted to CCSs.[10] Gray instructed all regimental medical officers in the application of the Thomas Splint and they, in turn, taught their stretcher bearers. Each Regimental Aid Post was equipped with approximately ten Thomas Splints to transport patients with compound fractures of the femur to nearby CCSs specialising in the management of such wounds.

Before 1917, when the majority of femoral fractures were inadequately splinted, Gray quoted a mortality of 50% in CCSs;[10] others died before reaching there. One proposed management regime was that all compound femoral fractures should be treated by amputation using 'a quick whiff of nitrous oxide and oxygen', since this least harmful anaesthetic regime might salvage a few shocked soldiers who otherwise would have died undergoing major limb sparing surgery. Fortunately, in Gray's series, using the Thomas Splint, only 5% were unfit for limb salvage surgery. His mortality rate was 15.6%, a reduction of more than 30%.[10]

Gray's amputation rate was only 17.2%. Many of these patients had major nerve or blood vessel damage or were infected beyond any hope of salvage, making amputation the only feasible option. Gray observed that of those who died, many had lain in No Man's Land for many hours and were beyond surgical help.[10]

Wounds excisions Techniques for Limb- Salvaging surgery in compound femoral fractures

By October 1914, Gray realised the importance of removing all devitalised and contaminated tissues from wounds. In 1915, the technique of wound excision became firmly established. The anaerobic conditions predisposing to gas gangrene were thereby eliminated. Sometimes wounds looked innocuous and there was a temptation to transfer patients with such wounds to base hospitals for surgery. This was a mistake, because tissue contamination was always worse than first appearances sometimes suggested.

The field dressing and splint were removed under general anaesthesia in an operating theatre in the CCS. Entrance and exit wounds were extended widely. There was invariably a huge amount of dead muscle which was excised until only healthy bleeding muscle remained. Bone ends were cleansed of filth, and loose fragments of bone with no soft tissue attachments were removed.All foreign bodies were removed.At the completion of the procedure only healthy, viable tissue remained. This systematic aggressive excision of all devitalised tissue was the fundamental principle of war surgery.

In favourable cases, operated on before infection was established, Gray advocated primary closure of the wound.[11] If there was doubt about the completeness of the surgical excision, delayed primary closure was employed, taking a 'second look' two or three days after the wound excision and closing the wound if all was well. The second look was usually performed at a base hospital, the primary excision having been carried out at a CCS. Gray used

hypertonic salt dressings packed into the wound after primary wound excision.The pack was removed at the time of delayed primary closure.
In cases where wounds were already infected on admission to CCSs, patients first underwent excision of the wound, before it was either packed with hypertonic salt dressings or irrigated with antiseptic agents such as flavine, iodoform, boric acid or Dakin's solution, which used sodium hypochlorite as its active ingredient. Antiseptics were sometimes helpful but were no substitute for surgical removal of dead, contaminated tissue. Granulation tissue gradually covered the wound surfaces, provided those surfaces had a blood supply.The wound could usually be closed secondarily after two to three weeks. In hopelessly infected cases, amputation was the best initial option.

An experienced surgeon was needed to make the right decision for each individual patient. Casualty clearing stations dealing with compound fractures of the femur were staffed by surgeons familiar with such wounds. Patients were transferred to special designated general or stationary hospitals at base where they remained for six weeks until the fracture was 'sticky' and at low risk of losing position during transfer back to Britain. During the Battle of the Somme in 1916,there were 3,173 compound fractures of the femur in designated general and stationary hospitals in France awaiting return to Britain.[12] For practical purposes, stationary and general hospitals differed only in size, general being larger. By 1917, three newly built general hospitals each had 2,500 beds.[12]

When mobile warfare returned on 21 March 1918 with the German spring offensive, CCSs lost their semipermanent status and reverted to the use of large tents. Jones did not believe that it was possible to treat patients with femoral fractures in a tent since there was nowhere to suspend heavy weights and beams necessary to maintain the reduction of fractures. Some patients arrived in Britain with several inches of shortening requiring treatment either by traction alone or by oblique osteotomy at the healing fracture site followed by traction in order to restore length.[13]

Henry Gray's other achievements

Gray was regarded as perhaps the most capable military surgeon of his generation. He published work in the *British Medical Journal* on subjects including infected gunshot wounds,[14] gunshot wounds of the head[15] and gas gangrene.[16] If a wound were thoroughly excised and all devitalised tissue removed, then the patient would not develop gas gangrene. If a patient had gangrene, he could only be saved by excision of all dead tissue. Gray removed a bullet from a soldier's heart under local anaesthetic, confirming that he, like all British surgeons of his era, was a general surgeon.[17]

Gray worked extensively on the treatment of penetrating wounds of the knee joint.[18] Early in the war, such wounds usually resulted in loss of limb or life, as they had throughout the nineteenth century. According to Gray, 'at the record of a healed stiff joint, one felt almost inclined to cheer, while the story of movement following an operation sounded like a fairy tale.'[10]

Early surgery followed by primary closure was of paramount importance to preserve joint function. If infection supervened, joint disintegration with complete loss of function invariably resulted.This was often associated with a breakdown of the patient's general resistance so that amputation was the only way to save the patient's life. Great experience was required to excise the wound and still be able to close the joint. Sometimes it proved impossible to close the skin completely, but if the synovial membrane could be approximated, effectively excluding the knee joint from the outside world, then a satisfactory outcome could

be anticipated. 'Now what were fairy tales are commonplace, and great is the satisfaction to those who were out in the dark days of surgery,' commented Gray in his 1919 work, *The early treatment of war wounds*.[10]

Gray's strengths and weaknesses

Gray was highly regarded as a surgeon by his peers. John Lynn Thomas, Deputy Inspector of Military Orthopaedics, Western Command, acknowledged Gray's contribution to the management of septic wounds of the limbs.[19] Andrew Dillan Carberry, who wrote *The history of the New Zealand Medical Services in the Great War*, said of Gray:

The Third Army – which the New Zealanders found to be no less highly organised than our own much admired Second Army – early in May re-opened its schools of instruction temporarily interrupted by the German invasion. Surgery especially that of the front line was a specialty of this Army, whose Consulting Surgeon, Colonel HMW Gray was noted since 1916 for his work in the treatment of compound gunshot fractures. His memoranda, issued by the Third Army in 1917 formed the basis of the front line surgical practice of this and other armies, and his well known book, The Early Treatment of War Wounds, … epitomised the advancing knowledge of that period.[20]

Gray loved working with the young surgeons whom he supervised at CCSs and regarded it a great privilege to have been able to make constructive recommendations for the management of wounded soldiers which were 'the outcome of concentrated observation and thought by one who has had unusual opportunities, and of discussion with numerous brilliant young surgeons possessed of fresh active brains and equally dexterous hands'.[10]

Unfortunately, while Gray's work as a surgeon was admired by his peers, he often did not get on with them. Following the publication of Gray's book *The early treatment of war wounds* in 1919, based on a series of scientific papers written by Gray and published during the war, Sir Anthony Bowlby attempted to discredit the evidence for the high mortality of patients with a compound femoral fracture in the early years of the war, declaring it to have been significantly less than the quoted figure of 80%. He said it was only 16% at CCSs in 1915.[21]

'Had his remarks gone unchallenged, then those who had not given serious consideration to the matter would receive a wrong impression of the appalling seriousness of this injury, especially in the early years of the war,'[22] Gray responded in a strongly worded letter to the *British Medical Journal*, declaring Bowlby's figures had been based on notoriously inaccurate 1915 admission books at CCSs. At the three CCSs used by Bowlby, only 141 cases of compound fractures of the femur were recorded, with 23 deaths giving a mortality of 16%.This was a far smaller number of cases than would have been expected to have occurred during that period. The accepted incidence of compound femoral fractures was one per 50–60 admissions. Bowlby should have had 500 more cases on which to base his mortality assessment. In cases of multiple wounds admitted to CCSs the fractured femur was often not even mentioned and some other component of the patient's injuries was documented in the record. Gray, in contrast, had based his assessment on a careful study of all cases when he arrived at a mortality figure of 80%.

Gray felt that Bowlby had attempted to diminish appreciation of the excellent progress in the handling of such cases: 'Speaking generally, the enormous improvement in treatment and consequently results is one of the brightest records of the medical service.'[22]

American contribution

While Gray made progress in the management of musculoskeletal wounds in CCSs, Jones experienced staffing problems in Britain's orthopedic centres, which had 20,000 beds in total. Junior medical officers working in orthopedic centres were frequently sent to the Western Front. Help came from American orthopedic surgeons when the USA entered the war in April 1917. American surgeons had been frequent visitors to Jones' clinics and operating sessions in Liverpool before the war and greatly admired his work. Initially 20 orthopedic surgeons under Joel Goldthwaite came to Britain; paid by the US Military, they were put at Jones' disposal. Soon another 60 surgeons came across to work in orthopedic centres around Britain.[5]

In May 1917, the American surgeon Robert Osgood visited those orthopaedic centres where American surgeons were employed.While in Britain,Osgood made an important contribution by stimulating confidence among British surgeons to establish the British Orthopaedic Association.[5] The inaugural meeting was held in the Café Royal, London, on 28 November 1917 and the first scientific meeting was held on 2 February 1918.

Jones and Gray after the war

After the war, Jones hoped that orthopaedic surgery would flourish and that orthopaedic departments would be attached to hospitals, but it was not to be. Symbolic of the prevailing mood, and in no small measure due to professional jealousy and rivalry, Shepherd's Bush was restored to its original workhouse state.It would be many years before orthopaedic surgery finally re-emerged to be recognised as a specialty in its own right.

Jones returned to Liverpool after the war and became the father figure of British orthopaedic surgery. He had established a hospital in Oswestry before the war with Agnes Hunt. In the fullness of time, the Robert Jones and Agnes Hunt Hospital would become recognised as a centre of orthopaedic excellence.

Gray returned to Aberdeen, but he never settled. He was awarded a knighthood and became an Honorary LLD University of Aberdeen, both for his services to war surgery. He emigrated to Canada to fill the position of Chief of Surgery at the Royal Victoria Hospital in Montreal, but didn't fit in. He fell from favour[23] and disappeared into surgical obscurity.

Henry Gray's name is unknown in his home city of Aberdeen. It is as though his major contributions to war surgery had never been. Perhaps, in the 100th anniversary of the 'war to end wars' it is time to put this right.

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Great teachers of all times

Remembering the Fathers of Critical Care Medicine….

Dr. Aruna Munasinghe

Max Harry Weil, M.D., Ph.D., Sc.D died, Friday, July 29th 2011. He was supposed to be the person who introduced the term of critical care to the world of medicine.

The Coachella Valley became familiar with Dr. Weil in 1991, when he moved the international headquarters of the Weil Institute of Critical Care Medicine to Palm Springs and later to its current location in Rancho Mirage in 2005.

According to The Weil Institute, the doctor-- who co-authored some 1,300 articles and books and held 25 U.S. patents-- moved to California, "because the more liberal attitude towards

Invasive cardiology allowed him to pursue his research in new ways to save the life of a critically ill patient."

At the time of his death, Dr. Weil was still actively teaching Cardiopulmonary Resuscitation (CPR), designing research projects, and supervising the education of research fellows from around the world in the field of critical care and life support, according to the Institute.

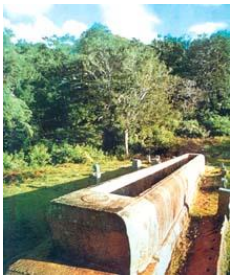
Some called him, "The Father of Critical Care Medicine."

Dr. Weil was born in 1927 in Berlin, and moved to the United States at the age of 10. Though the cause of death was not released, the Institute says Dr. Weil "passed away peacefully."

Prof Vladimir Aleksandrovich Negovsky – "the father of reanimatorlogy "

"Sudden death," even from a massive heart attack or in shock on the operating table, is not really sudden. After the heart stops, there may be a few last, shallow breaths. The brain lives on for five or six minutes, and perhaps longer under some conditions. In Moscow last week, at the Fifth International Congress on Biochemistry, Soviet investigators reported new findings about the dying brain, and new means of bringing the "dead" back to life.

A tall, grey-haired woman doctor, Maria Sergeevna Gaievskaya, described methods developed in Dr. Vladimir Aleksandrovich Negovsky's Resuscitation..."Times magazine Friday, Aug. 25, 1961



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