Indian Journal of Anesthesia and Analgesia

Aims and Scope

The Indian Journal of Anesthesia and Analgesia (IJAA) is official peer-reviewed scientific journal addresses all aspects of anesthesia practice, including anesthetic administration, pharmacokinetics, preoperative and postoperative considerations, coexisting disease and other complicating factors, cost issues, and similar concerns anesthesiologists contend with daily. The Journal seeks a balance between outstanding basic scientific reports and definitive clinical and management investigations. The Journal welcomes manuscripts reflecting rigorous analysis, even if unusual in style and focus.
Readership: Anesthesiologists, Critical Care Physicians and Surgeons.

Journal Website

http://www.rfppl.co.im

Subscription Information

The Indian Journal of Anesthesia and Analgesia is published two times a year.

For information on subscription rates please contact

Red Flower Publication Pvt. Ltd.

48/41-42, DSIDC, Pocket-II

Mayur Vihar Phase-I

Delhi – 110 091(India)

Phone: 91-11-22754205, 45796900

Fax: 91-11-22754205

E-mail: redflowerppl@vsnl.net

Website: www.rfppl.co.in

The journal is distributed free of cost to members of editorial board. Institutional subscription rates (India) INR 4000 and (other countries) USD600.

All correspondence regarding individual and society subscriptions, subscription rates for 2014 and advertisements should be addressed to: rfpsubscriptions@gmail.com.

Advertisement

E-mail:rfpsubscriptions@gmail.com.

Disclaimer

Red Flower Publication Pvt. Ltd. publishes advertisement in this journal reliance upon the responsibility of the advertiser to comply with all legal requirements relating to the marketing and sale of products or services advertised. Red Flower Publication Pvt. Ltd. and the editors are not responsible for claims make in the advertisement published in the journal. The appearance of advertisements in Red Flower Publication Pvt. Ltd. publications does not constitute endorsement, implied or intended, of the product advertised or the claims make for it by the advertiser.

The views expressed in this publication do not necessarily reflect those of Red Flower Publication Pvt. Ltd. Red Flower Publication Pvt. Ltd. do not endorse the quality or the value of the advertised/sponsored products described therein.

Office of Publication

Red Flower Publication Pvt. Ltd.
48/41-42, DSIDC, Pocket-II
Mayur Vihar Phase-I
Delhi – 110 091(India)
Phone: 91-11-22754205, 45796900
Fax: 91-11-22754205
E-mail: redflowerppl@vsnl.net
Website: www.rfppl.co.in

Guidelines for Authors

Manuscripts must be prepared in accordance with "Uniform requirements for Manuscripts submitted to Biomedical Journal" developed by international committee of medical Journal Editors.

Types of Manuscripts and Limits

Original articles: Up to 3000 words excluding references and abstract and up to 10 references.

Original articles: Up to 2500 words excluding references and abstract and up to 10 references.

Case reports: Up to 1000 words excluding references and abstract and up to 10 references.

Online Submission of the Manuscripts

Articles can also be submitted online from http://www.rfppl.com (currently send your articles through e-mail attachments)

I) First Page File: Prepare the title page, covering letter, acknowledgement, etc. using a word processor program. All information which can reveal your identity should be here. use text/rtf/doc/PDF files. Do not zip the files.

2) Article file: The main text of the article, beginning from Abstract till References (including tables) should be in this file. Do not include any information (such as acknowledgement, your name in page headers, etc.) in this file. Use text/rtf/doc/PDF files. Do not zip the files. Limit the file size to 400 kb. Do not incorporate images in the file. If file size is large, graphs can be submitted as images separately without incorporating them in the article file to reduce the size of the file.

3) Images: Submit good quality color images. Each image should be less than 100 kb in size. Size of the image can be reduced by decreasing the actual height and width of the images (keep up to 400 pixels or 3 inches). All image formats (jpeg, tiff, gif, bmp, png, eps etc.) are acceptable; jpeg is most suitable.

Legends: Legends for the figures/images should be included at the end of the article file.

If the manuscript is submitted online, the contributors' form and copyright transfer form has to be submitted in original with the signatures of all the contributors within two weeks from submission. Hard copies of the images (3 sets), for articles submitted online, should be sent to the journal office at the time of submission of a revised manuscript. Editorial office: **Red Flower Publication Pvt. Ltd., 48/41-42, DSIDC, Pocket-II, Mayur Vihar Phase-I, Delhi – 110 091, India, Phone: 91-11-22754205, 45796900, Fax: 91-11-22754205, E-mail: redflowerppl@vsnl.net.**

Preparation of the Manuscript

The text of observational and experimental articles should be divided into sections with the headings: Introduction, Methods, Results, Discussion, References, Tables, Figures, Figure legends, and Acknowledgment. Do not make subheadings in these sections.

Title Page

The title page should carry

1) Type of manuscript (e.g. Original article, Review article, Case Report)
2) The title of the article, which should be concise, but informative;
3) Running title or short title not more than 50 characters;
4) The name by which each contributor is known (Last name, First name and initials of middle name), with his or her highest academic degree(s) and institutional affiliation;
5) The name of the department(s) and institution(s) to which the work should be attributed;
6) The name, address, phone numbers, facsimile numbers and e-mail address of the contributor responsible for correspondence about the manuscript;
7) The total number of pages, total number of photographs and word counts separately for abstract and for the text (excluding the references and abstract);
8) Source(s) of support in the form of grants, equipment, drugs, or all of these;
9) Acknowledgement, if any; and
l0) If the manuscript was presented as part at a meeting, the organization, place, and exact date on which it was read.

Abstract Page

The second page should carry the full title of the manuscript and an abstract (of no more than 150 words for case reports, brief reports and 250 words for original articles). The abstract should be structured and state the Context (Background), Aims, Settings and Design, Methods and Material, Statistical analysis used, Results and Conclusions. Below the abstract should provide 3 to 10 keywords.

Introduction

State the background of the study and purpose of thestudy and summarize the rationale for the study or observation.

Methods

The methods section should include only information that was available at the time the plan or protocol for the study was written such as study approach, design, type of sample, sample size, sampling technique, setting of the study, description of data collection tools and methods; all information obtained during the conduct of the study belongs in the Results section.

Reports of randomized clinical trials should be based on the CONSORT Statement (http://www. consort-statement. org). When reporting experiments on human subjects, indicate whether the procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional or regional) and with the Helsinki Declaration of 1975, as revised in 2000 (available at http://www.wma.net/e/policy/l 7-c_e.html).

Results

Present your results in logical sequence in the text, tables, and illustrations, giving the main or most important findings first. Do not repeat in the text all the data in the tables or illustrations; emphasize or summarize only important observations. Extra or supplementary materials and technical details can be placed in an appendix where it will be accessible but will not interrupt the flow of the text; alternatively, it can be published only in the electronic version of the journal.

Discussion

Include summary of key findings (primary outcome measures, secondary outcome measures, results as they relate to a prior hypothesis); Strengths and limitations of the study (study question, study design, data collection, analysis and interpretation); Interpretation and implications in the context of the totality of evidence (is there a systematic review to refer to, if not, could one be reasonably done here and now?, what this study adds to the available evidence, effects on patient care and health policy, possible mechanisms); Controversies raised by this study; and Future research directions (for this particular research collaboration, underlying mechanisms, clinical research). Do not repeat in detail data or other material given in the Introduction or the Results section.

References

List references in alphabetical order. Each listed reference should be cited in text (not in alphabetic order), and each text citation should be listed in the References section. Identify references in text, tables, and legends by Arabic numerals in square bracket (e.g. [10]). Please refer to ICMJE Guidelines (http://www.nlm.nih.gov/bsd/uniform_requirements.html) for more examples.

Standard journal article

[1] Flink H, Tegelberg Å, Thörn M, Lagerlöf F. Effect of oral iron supplementation on unstimulated salivary flow rate: A randomized, double-blind, placebo-controlled trial. J Oral Pathol Med 2006;35:540-7.

[2] Twetman S, Axelsson S, Dahlgren H, Holm AK, Källestål C, Lagerlöf F, et al. Caries-preventive effect of fluoride toothpaste: A systematic review. Acta Odontol Scand 2003;61:347-55.

Article in supplement or special issue

[3] Fleischer W, Reimer K. Povidone iodine antisepsis. State of the art. Dermatology 1997;195 Suppl 2:3-9.

Corporate (collective) author

[4] American Academy of Periodontology. Sonic and ultrasonic scalers in periodontics. J Periodontol 2000;71:1792-801.

Unpublished article

[5] Garoushi S, Lassila LV, Tezvergil A, Vallittu PK. Static and fatigue compression test for particulate filler composite resin with fiber-reinforced composite substructure. Dent Mater 2006.

Personal author(s)

[6] Hosmer D, Lemeshow S. Applied logistic regression, 2nd edn. New York: Wiley-Interscience; 2000.

Chapter in book

[7] Nauntofte B, Tenovuo J, Lagerlöf F. Secretion and composition of saliva. In: Fejerskov O, Kidd EAM, editors. Dental caries: The disease and its clinical management. Oxford: Blackwell Munksgaard; 2003. p. 7-27.

No author given

[8] World Health Organization. Oral health surveys - basic methods, 4th edn. Geneva: World Health Organization; 1997.

Reference from electronic media

[9] National Statistics Online—Trends in suicide by method in England and Wales, 1979-2001. www.statistics.gov.uk/downloads/theme_health/HSQ 20.pdf (accessed Jan 24, 2005): 7-18. Only verified references against the original documents should be cited. Authors are responsible for the accuracy and completeness of their references and for correct text citation. The number of reference should be kept limited to 20 in case of major communications and 10 for short communications.

More information about other reference types is available at www.nlm.nih.gov/bsd/uniform_requirements.html, but observes some minor deviations (no full stop after journal title, no issue or date after volume, etc).

Tables

Tables should be self-explanatory and should not duplicate textual material.

Tables with more than 10 columns and 25 rows are not acceptable.

Number tables, in Arabic numerals, consecutively in the order of their first citation in the text and supply a brief title for each.

Explain in footnotes all non-standard abbreviations that are used in each table.

For footnotes use the following symbols, in this sequence: *, ¶, †, ‡‡,

Illustrations (Figures)

Graphics files are welcome if supplied as Tiff, EPS, or PowerPoint files of minimum 1200x1600 pixel size. The minimum line weight for line art is 0.5 point for optimal printing.

When possible, please place symbol legends below the figure instead of to the side.

Original color figures can be printed in color at the editor's and publisher's discretion provided the author agrees to pay

Type or print out legends (maximum 40 words, excluding the credit line) for illustrations using double spacing, with Arabic numerals corresponding to the illustrations.

Sending a revised manuscript

While submitting a revised manuscript, contributors are requested to include, along with single copy of the final revised manuscript, a photocopy of the revised manuscript with the changes underlined in red and copy of the comments with the point to point clarification to each comment. The manuscript number should be written on each of these documents. If the manuscript is submitted online, the contributors' form and copyright transfer form has to be submitted in original with the signatures of all the contributors within two weeks of submission. Hard copies of images should be sent to the office of the journal. There is no need to send printed manuscript for articles submitted online.

Reprints

Journal provides no free printed reprints, however a author copy is sent to the main author and additional copies are available on payment (ask to the journal office).

Copyrights

Declaration

A declaration should be submitted stating that the manuscript represents valid work and that neither this manuscript nor one with substantially similar content under the present authorship has been published or is being considered for publication elsewhere and the authorship of this article will not be contested by any one whose name (s) is/are not listed here, and that the order of authorship as placed in the manuscript is final and accepted by the co-authors. Declarations should be signed by all the authors in the order in which they are mentioned in the original manuscript. Matters appearing in the Journal are covered by copyright but no objection will be made to their reproduction provided permission is obtained from the Editor prior to publication and due acknowledgment of the source is made.

Abbreviations

Standard abbreviations should be used and be spelt out when first used in the text. Abbreviations should not be used in the title or abstract.

Checklist

- Manuscript Title
- Covering letter: Signed by all contributors
- Previous publication/ presentations mentioned Source of funding mentioned
- Conflicts of interest disclosed

Authors

- Middle name initials provided.
- Author for correspondence, with e-mail address provided.
- Number of contributors restricted as per the instructions
- Identity not revealed in paper except title page (e.g. name of the institute in Methods, citing previous study as 'our study')

Presentation and Format

- Double spacing
- Margins 2.5 cm from all four sides
- Title page contains all the desired information. Running title provided (not more than 50 characters)
- Abstract page contains the full title of the manuscript
- Abstract provided: Structured abstract provided for an original article.
- Key words provided (three or more)
- Introduction of 75-100 words

- Headings in title case (not ALL CAPITALS). References cited in square brackets
- References according to the journal's instructions

Language and grammar

- Uniformly American English
- Abbreviations spelt out in full for the first time. Numerals from 1 to l0 spelt out
- Numerals at the beginning of the sentence spelt out

Tables and figures

- No repetition of data in tables and graphs and in text.
- Actual numbers from which graphs drawn, provided.
- Figures necessary and of good quality (color)
- Table and figure numbers in Arabic letters (not Roman).
- Labels pasted on back of the photographs (no names written)
- Figure legends provided (not more than 40 words)
- Patients' privacy maintained, (if not permission taken)
- Credit note for borrowed figures/tables provided
- Manuscript provided on a CDROM (with double spacing)

Submitting the Manuscript

- Is the journal editor's contact information current?
- Is a cover letter included with the manuscript? Does the letter

1. Include the author's postal address, e-mail address, telephone number, and fax number for future correspondence?
2. State that the manuscript is original, not previously published, and not under concurrent consideration elsewhere?
3. Inform the journal editor of the existence of any similar published manuscripts written by the author?
4. Mention any supplemental material you are submitting for the online version of your article?

Contributors' Form (to be modified as applicable and one signed copy attached with the manuscript)

Revised Rates for 2014 (Institutional)

Title	Freequency	Rate (Rs): India	Rate ($):ROW
Dermatology International	2	2500	280
Gastroenterology International	2	3500	360
Indian Journal of Agriculture Business	2	4500	300
Indian Journal of Anatomy	2	3200	260
Indian Journal of Ancient Medicine and Yoga	4	6600	330
Indian Journal of Anesthesia and Analgesia	2	4000	600
Indian Journal of Anthropology	2	8000	500
Indian Journal of Applied Physics	2	3500	400
Indian Journal of Biology	2	1500	170
Indian Journal of Cancer Education and Research	2	4500	500
Indian Journal of Communicable Diseases	2	1000	58
Indian Journal of Dental Education	4	3200	288
Indian Journal of Forensic Medicine and Pathology	4	12500	576
Indian Journal of Forensic Odontology	4	3200	288
Indian Journal of Genetics and Molecular Research	2	5000	262
Indian Journal of Law and Human Behavior	2	5000	500
Indian Journal of Library and Information Science	3	7500	600
Indian Journal of Maternal-Fetal & Neonatal Medicine	2	4500	400
Indian Journal of Mathematics and Statistics	2	3000	200
Indian Journal of Medical & Health Sciences	2	1800	120
Indian Journal of Obstetrics and Gynecology	2	2000	200
Indian Journal of Pathology: Research and Practice	2	3000	915
Indian Journal of Plant and Soil	2	5000	1700
Indian Journal of Preventive Medicine	2	3200	270
Indian Journal of Reproductive Science and Medicine	4	3000	180
Indian Journal of Scientific Computing and Engineering	2	3300	280
Indian Journal of Surgical Nursing	3	1800	70
Indian Journal of Trauma & Emergency Pediatrics	4	6500	302
International Journal of Agricultural & Forest Meteorology	2	8000	800
International Journal of Food, Nutrition & Dietetics	2	3200	900
International Journal of History	2	6000	500
International Journal of Neurology and Neurosurgery	2	7500	276
International Journal of Political Science	2	5000	400
International Journal of Practical Nursing	3	1500	70
International Physiology	2	4000	240
Journal of Animal Feed Science and Technology	2	3500	280
Journal of Cardiovascular Medicine and Surgery	2	5500	238
Journal of Orthopaedic Education	2	2500	190
Journal of Pharmaceutical and Medicinal Chemistry	2	3000	350
Journal of Psychiatric Nursing	3	1800	70
Journal of Social Welfare and Management	4	6600	276
Meat Science International	2	5000	500
Microbiology and Related Research	2	3800	150
New Indian Journal of Surgery	4	6500	360
Ophthalmology and Allied Sciences	2	3000	150
Otolaryngology International	2	2000	300
Pediatric Education and Research	4	3200	150
Physiotherapy and Occupational Therapy Journal	4	7000	360
Urology, Nephrology and Andrology International	2	2200	350

Terms of Supply:

1. Advance payment required by Demand Draft payable to Red Flower Publicaion Pvt. Ltd. payable at Delhi.
2. Cancellation not allowed except for duplicate payment.
3. Agents allowed 10% discount.
4. Claim must be made within six months from issue date.

Order from

Red Flower Publication Pvt. Ltd., 48/41-42, DSIDC, Pocket-II, Mayur Vihar Phase-I, Delhi - 110 091 (India), Tel: 91-11-22754205, 45796900, Fax: 91-11-22754205. E-mail: redflowerppl@vsnl.net, redflowerppl@gmail.com, Website: www.rfppl.co.in

INDIAN JOURNAL OF ANAESTHESIA AND ANALGESIA

July - December, 2014
Volume 1 Number 2

Contents

BOOKS FOR SALE

CHILD INTELLIGENCE

By **Dr. Rajesh Shukla**

ISBN: 81-901846-1-X, Pb, vi+141 Pages

Price: Rs.150/-, US$50/-

Published by **World Informations Syndicate**

This century will be the century of the brain. Intelligence will define success of individuals; it remains the main ingredient of success. Developed and used properly, intelligence of an individual takes him to greater heights. Ask yourself, is your child intelligent! If yes, is he or she utilizing the capacity as well as he can? I believe majority of people, up to 80% may not be using their brain to best potential. Once a substantial part of life has passed, effective use of this human faculty cannot take one very far. So, parents need to know how does their child grow and how he becomes intelligent in due course of time. As the pressure for intelligence increases, the child is asked to perform in different aspects of life equally well. At times, it may be counter-productive. Facts about various facets of intelligence are given here. Other topics like emotional intelligence, delayed development, retardation, vaccines, advice to parents and attitude have also been discussed in a nutshell. The aim of this book is to help the child reach the best intellectual capacity. I think if the book turns even one individual into a user of his best intelligence potential, it is a success.

PEDIATRICS COMPANION

By Dr. Rajesh Shukla

ISBN: 81-901846-0-1, Hb, VIII+392 Pages

Price: Rs.250/-, US$50

Published by **World Informations Syndicate**

This book has been addressed to young doctors who take care of children, such as postgraduate students, junior doctors working in various capacities in Pediatrics and private practitioners. Standard Pediatric practices as well as diseases have been described in a nutshell. List of causes, differential diagnosis and tips for examination have been given to help examination-going students revise it quickly. Parent guidance techniques, vaccination and food have been included for private practitioners and family physicians that see a large child population in our country. Parents can have some understanding of how the doctors will try to manage a particular condition in a child systematically. A list of commonly used pediatric drugs and dosage is also given. Some views on controversies in Pediatrics have also been included. Few important techniques have been described which include procedures like endotracheal intubations, collecting blood samples and ventilation. I hope this book helps young doctors serve children better.

Order from

Red Flower Publication Pvt. Ltd.

48/41-42, DSIDC, Pocket-II, Mayur Vihar, Phase-I

Delhi - 110 091 (India)

Tel: 91-11-22754205, 45796900, Fax: 91-11-22754205

E-mail: redflowerppl@gmail.org, redflowerppl@vsnl.net

Indian Journal of Anaesthesia and Analgesia
Volume 1 Number 2, July - December 2014

Litigation in Anesthesia Practice

K.K. Mubarak

Introduction

Though safe anaesthesia practice has improved the quality of medical care, perioperative adverse patient outcomes are not uncommon. As the anaesthesiologist manipulates the human physiology, often in a diseased condition, the risk is quite high. When the patient outcome is not as expected, there is chance for medical litigation. The complications may be due to patient factors, human errors, or equipment malfunctioning. The anesthesiologist should anticipate such situations and take precautions to ensure a safe patient outcome, thus reducing the chances for litigation. Litigations have led physicians to take due precautions and patient care leading to a safer medical practice.

The motive behind litigation may not be always financial gain. It can be a psychological reaction of the patient or their relatives to the treating doctor, who feels that due care was not given. At times it may be due to a poor doctor-patient relationship.

Types of Cases

Anesthesiologist can be charged with either a civil or criminal case. Civil case is filed in the court or consumer forum seeking compensation for the harm caused to the patient. Criminal case is filed in a police station, and after investigation the doctor is prosecuted, if the offence is found to be of serious nature. He will be punished if found guilty, but the complainant does not get any compensation.

Medical Malpractice

It is the failure to provide professional care with the ordinary skill given by another member of the profession of similar quality, resulting in injury, damage or loss to the patient. Malpractice suit is often raised against those who has exhibited negligence and did not abide to the prescribed standards of care.

Standards of Care

It is how the physician should act as prescribed by the professional body, based on scientific principles and standard text books. This is usually looked by the court to assess whether reasonable care has been given or not. The practitioner should discharge reasonable standards of care and competence to his patient. Neither a very high nor a low degree of care and competence is expected by the court.

Standards of Care in Anesthesia Practice

This has to be assessed in view of the circumstances at the time of the incident. While evaluating, factors such as condition of the patient, experience of the surgeon, nature of the procedure, availability of drugs and equipments has to be considered.

The anesthesiologist should do a preanaesthetic

assessment on the previous day for all elective cases. In addition to clinical examination, he should go through the relevant investigations and get necessary interdisciplinary consultations. He should explain the contemplated anesthetic procedure to the patient or their caretakers and get a written informed consent.

Informed Consent

It should contain a fair and clear explanation of the procedure and the risks and complications that might occur, specific to the patient. Though a common consent is taken for anesthesia and surgery, a consent specifically mentioning the risks and details of anaesthesia will be more valid in the Court.

Anaesthetic Procedure

Anaesthesiologist has the primary responsibility to choose the right anaesthetic technique for the planned procedure. Never select a technique against the wishes of the patient. He should confirm the patient, type and side of the surgery before anesthetizing. The surgeon is not expected to commit on the anaesthetic technique, but can ask for surgical requirements (e.g. abdominal relaxation, induced hypotension).

The anesthesiologist should be present throughout the conduct of anesthesia till the patient is stable in the postoperative room. He should respect the dignity of the patient and should not make adverse comments when anaesthetized. Providing adequate anesthesia, pain relief and prevent intraoperative awareness in a safe way are his primary concerns. He is responsible for the maintenance of vital parameters and should continuously monitor them aided by monitoring devices. He should ensure, patient safety during surgical positioning. Any change in the vital parameters or equipment malfunctioning which endangers the patient has to be immediately recognised and properly dealt with. In case of any unexpected event (e.g. lip injury during intubation, high spinal following epidural), proper documentation should be done and the patient or the caretakers should be informed later.

Qualification and Experience

A practitioner is expected to practice only the particular system or branch of medicine he has studied and registered. Inexperience or lack of knowledge is no defense and is likely to be medical negligence. A patient has the right to get due care and competency from a qualified and experienced person. As medical practices are likely to change over time, the practitioner should be updated with the current standards of practice.

Vicarious Liability

If a senior anesthesiologist delegates duty to another person under his control, he will be responsible for the actions of the latter. Delegation of responsibility to an inexperienced, knowing that he will be unable to give reasonable care will amount to negligence. However, vicarious liability is not applicable to criminal liability of the junior. The hospital is liable for negligence of the employee and can be held responsible for faulty equipment or unqualified staff.

Error in Judgment

A doctor will not be negligent due to an error in judgment which has caused the damage, provided he has acted with reasonable standards of care. However, an error in judgment which is not expected from a person of similar competency which has caused the damage, can amount to negligence. Grave mistakes like using an unscientific technique or a wrong drug can lead to

liability or even lead to "res ipsa loquiter".

Res Ipsa Loquiter

This means that "things speak for themselves". Here, the damage would not have occurred without the wrong action of the doctor, such as failure to remove a pack or anesthetizing a wrong patient. Here, the burden of proof is on the defendant doctor and not the complainant.

Expert Witness

The court often assigns an expert to find whether adequate care was given to the patient. He will be an expert in the field and competent to assist the case by his skill and knowledge in a just and truthful way, but should not be a personal friend or relative of the complainant. Both the parties have the right to produce an expert to support their claims. Many a time, the success of the case depends on the opinion given by the expert witness. The court can dismiss the complaint if the complainant fails to produce an expert to substantiate the claim.

Medical Negligence

If the mishap has been proved to be due to lack of reasonable care or without a proper consent, the treating physician will be held responsible. In case of medical negligence, the patient (Plaintiff) must prove:

1. *Duty:* the anaesthesiologist owed him a duty or obligation.
2. *Breach of Duty:* the anaesthesiologist failed to fulfill his duty.
3. *Causation:* there is a close causal relationship between the anaesthesiologist's act and the injury.
4. *Damages:* damage occurred due to the anaesthesiologist's act.

Contributory Negligence

If a patient does not follow the doctor's instructions, which has resulted in the injury, he cannot claim for damages. e.g. Aspiration pneumonitis following anesthesia in a patient, who has not obeyed to the instruction of preoperative fasting.

Malpractice Damages

General damages are related to the pain and sufferings directly related to the injury. Special damages are consequences of the injury like medical expenses and lost income. Punitive damages are exemplary damages to punish the physician for his negligence and as a caution for others not to repeat such mistakes.

If Litigation is Anticipated

Maintain confidentiality and do not discuss the case casually with others. Ensure that the records are proper and complete, with date and time, name and signature with qualifications and designation. Never alter or tamper the records, which will be viewed by the court seriously. Collect as much details, facts and records relating the case to defend the case. Any clarifications regarding the case should be sought for and kept ready for the trial. In the court, the defendant will not be allowed to give his opinion, which the court will seek from the expert witness. He will only be allowed to recollect what has happened, and asked to answer the questions put forth towards him.

How to Present in the Court?

Behave in a polite way, observing the local rules. Do not become restless or panic. Answer to the questions put forth legibly in a calm manner with a clear voice, avoiding medical jargons. Do not provide extra information when not asked

for. Never become emotional, arrogant or make jokes and sarcastic comments. Do not try to teach the opposite counsel or the judge or try to show ones' knowledge and expertise. Try to convince the court that due care and precautions are taken in patient care and do not exaggerate the care given.

How to Avoid Litigation?

Ensure a proper written informed consent before taking up the patient for anaesthesia. Improve doctor-patient relationship during the preanaesthetic visit and explain the procedure and the risks involved taking their confidence. A male anesthesiologist should never anaesthetise a female in the absence of a female attendant. Keep updated the scientific developments and practice the currently accepted techniques, keeping to the "standards of care". Ensure that the patient is being continuously closely monitored and immediate care is taken in the event of any adverse occurrences. Always keep a good anesthetic record with documentation of all perioperative events with date and time, and corrections if any, duly signed. Never tamper the records. Court assumes that "if it is not written, it is not done". Involve multidisciplinary consultations and help of senior colleagues when needed. Ensure that the assistants and co-workers are properly qualified and trained. Keep the machines and equipments properly maintained with proper pre procedure check up. Take precautions to avoid wrong drugs and dosages, and discard the expired drugs. In case of anticipated difficulty in procedures like endotracheal intubation, regional techniques or invasive monitoring, get expert help or refer to a better centre. In case of a mishap, never abandon the patient and make sure that the patient has been properly handed over to the right person and place, where due care can be given.

Finally, the anaesthesiologist should not take up a case if he himself is physically or mentally exhausted which can endanger the patient's life.

Dr. K. K. Mubarak
Editor-in-Chief IJAA
Professor & Head,
Anaesthesiology,
Govt. Medical College,
Kozhikode, Kerala
E-mail: mubarakdr@yahoo.co.in

References

1. Tabbarah R, Tabbarah S, Kanazi GE. Medicolegal aspects of Anesthesia: How to lead a happy life. *M E J Anesth.* 2006; 18(5).
2. SC Parakh. Legal aspects of Anaesthesia Practice. *Indian Journal of Anesthesia.* 2008; 52(3): 247-57.
3. Shivakumar Kumbar. Vicarious liability-Medicolegal status of anaesthesiologist. *Indian Journal of Anesthesia.* 2010; 54(2).
4. JP Adams,MD, D Bell, AR Bodenham. Quality and outcomes in anaesthesia: lessons from litigation. *Br J Anaesth.* 2012; 109(1): 110-122.

N.B: The author has personal experience in facing litigation in which the court has appreciated the patient care given by the doctors.

Original Article

Indian Journal of Anaesthesia and Analgesia
Volume 1 Number 2, July - December 2014

Intrathecal Bupivacaine Vs Bupivacaine and Clonidine in Paediatrics Age Group: A Comparative Evaluation

Jambure Nagesh*, Patil Pramod, Wagh Rahul*, Deshmukh Ujjwal***

Abstract

Context: spinal anaesthesia is advantageous in that it uses small dose, simple to perform and offers a rapid onset of action, reliable surgical analgesia and good muscle relaxation. First report of paediatric spinal anaesthesia was published by August Bier in 1899 with Cocaine in 11 year old child for ischium abscess drainage. **Aims:** To compare the efficacy, duration, quality and side effects of intrathecal Bupivacaine alone and Bupivacaine plus clonidine in paediatric patients. **Settings and Design:** Patients were randomly allocated in two groups. Group-A received Bupivacaine 0.5% heavy (0.4mg/kg for 5-15kg or 0.3mg/kg for >15 kg) and Group-B received Bupivacaine 0.5% heavy (0.4mg/kg for 5-15kg or 0.3mg/kg for >15kg) and preservative free Clonidine (1 mcg/kg). **Methods and Material:** A prospective randomised double blind study was carried out in 60 ASA-1 paediatric patients undergoing surgeries below T8 dermatome up to 2 hrs duration. Patients were randomly allocated in two groups. Group- A and Group-B comprising 30 patients each. Time of onset of sensory block, maximum level of sensory block, duration of sensory block, duration of post-op analgesia and side effects were observed. *Statistical Analysis Used:* Data obtained was subjected to statistical computation and analysed using computer programme statistical package for social science (SPSS) ver-16.0 and test performed were unpaired student-t test, nonparametric mann-whitney two samples test and Chi square test. Value of p <0.05 was considered significant and p<0.0000001 highly significant. **Results:** addition of preservative free clonidine (1mcg/kg) to 0.5% hyperbaric Bupivacaine provides prolonged spinal anaesthesia, superior pain relief and better sedation without causing severe adverse effects compare to Bupivacaine alone. **Conclusions:** clonidine is better adjuvant to Bupivacaine in spinal anaesthesia as far as patients comfort is concerned. It decreases the time taken for onset, produces longer duration of both surgical anaesthesia and postoperative analgesia and better quality of sedation with no added side effects as compare to Bupivacaine alone, in paediatric patients undergoing surgeries below T8 dermatome.

Keywords: Bupivacaine; Clonidine; Paediatric spinal.

Introduction

Pain is a major concern of human kind since our beginning and object of ubiquitous efforts to understand and to control it. Paediatric pain management is challenging and one of the frontiers of modern anaesthesia. First report on paediatric spinal was published by August Bier in 1899, when the technique was performed with cocaine in an 11 yr old boy for ischium abscess drainage.

Spinal anaesthesia is advantageous in that it uses small dose of anaesthetic, easy to perform and offer a rapid onset, reliable surgical analgesia and good muscle relaxation.

Author's Affiliations: *MD Anaesthesia Resident, **Professor & Head of Dept. Jawahar Medical Foundations, A.C.P.M. Medical College, Dhule - 424002, Maharashtra, India.

Corresponding Author: Dr. Pramod Patil, Flat No.2, Madhurani Apartment, Samrat Nagar, Jamanagiri Road, Dhule 424001, Maharashtra, India.

E-mail : drppatilpub@gmail.com

Advantages sometime offset by relatively short duration of action and complaints of postoperative pain when it wears off. Spinal anaesthesia with hyperbaric Bupivacaine hydrochloride is popular for longer procedure due to its prolonged duration but there is need to intensify and increased duration of sensory blocked without increasing the intensity and duration of motor blocked and thus prolong the duration of postoperative analgesia.

Various studies have shown that 1mcg/kg clonidine provides a significant improvement in spinal anaesthesia quality, duration and reduces the need of post-operative analgesic requirement without a significant side effects. [1,2,3,4,5,10,11] There is adequate evidence that á-2 adrenergic agonist clonidine given intrathecally produces anti nociceptive effects without any neurotoxicity and useful in the treatment of somatic pain.[1,2,3,4] However unlike spinal opioides clonidine does not produce pruritis and respiratory depression. The rationale behind intrathecal administration of clonidine is to achieve a high drug concentration in the vicinity of á-2 adrenoreceptors in spinal cord by blocking pain conduction of C and A-delta fibres. It increases potassium conductance in isolated neurons in-vitro and intensifies conduction block of local anaesthetic.[7] Aä fibres are myelinated afferent sensory nerve fibres, which conduct pain, cold, temperature and touch sensation, and C fibres are nonmyelinated postganglionic sympathetic fibres which conduct pain, warm temperature and touch sensation.[8] Clonidine is now an acceptable adjuvant to local anaesthetic for epidural route nevertheless clinical trial provide evidence that less clonidine is needed intrathecally than epidural to produce same analgesic effect with fewer side effects.

In the present study we tried to find out effectiveness of 1 mcg/kg intrathecal clonidine added to hyperbaric Bupivacaine on onset, quality, duration of analgesia and side effects if any in paediatric patients undergoing surgeries below T8 dermatome

Subjects and Methods

After approval from local ethical committee of institute and written valid informed consent from parents/guardians of all the patients with grade ASA 1 of physical status weight 5-30 kg and age 3-10 years and surgeries below T8 were enrolled for the study except those patients with known sensitivity to the drugs, gross spinal deformity and peripheral neuropathy. Patients were randomly allocated into two groups in a double blinded fashion based on computer generated code. Group-A (0.5% hyperbaric Bupivacaine (0.4 mg/kg for 5-15 kg or 0.3 mg/kg for >15 kg) and Group-B (0.5% hyperbaric Bupivacaine (0.4 mg/kg for 5-15 kg or 0.3 mg/kg for >15 with 1 mcg/kg preservative free clonidine). Detailed preoperative evaluation carried out in all patients and vital parameters noted, Routine investigations like complete blood count, BT, CT, random BSL, urine routine microscopy done. Patients were properly monitored in operation theatre and baseline parameters were noted. Monitoring commenced with pulse-oximeter (spo2), NIBP. peripheral venous access with 22/24 G cannula was secured on dorsum of the hand but there was no fluid preloading. They were premedicated with Glycopyrrolate 4mcg/kg iv before lumbar puncture. Patients were induced with O2 and sevoflurane for 3 mins. Lumbar puncture done in L4-L5 interspace with disposable hypodermic needles (27G *1.5 inches). Correct needle position confirmed by free CSF flow and the calculated dose of drug i.e. either

Bupivacaine alone (Group-A) or Bupivacaine plus clonidine (Group-B) injected intrathecally without barbotage. Patients then immedielty placed in supine position with slight head elevation. Intra-operative fluid is given by using 4-2-1 formula.i.e. Holiday seggar. After blocked following parameters related to sensory level were noted.

1. Time of onset of sensory blocked.
2. Maximum level of sensory blocked achieved.
3. Duration of sensory blocked.

Onset of block was defined as loss of sensitivity at the same dermatome level as lumbar puncture. The level of sensory block was determined by attempting to elicit grimace or acknowledgement of pain to bilateral pin prick at each dermatome from caudal to cephalad direction every 2 minutes. The adequacy of spinal anaesthesia was determined by the presence of profound motor block at ankle, knees and hip joints. Patients with failed spinal block were excluded from this study and surgery was performed under general anaesthesia. Vital parameters like HR, BP, RR, peripheral O2 saturation, sedation score noted every min for 5 mins thereafter every 5 min for 30 min, then every 30 min till 2 hrs. Then at 3rd hr and then every 2 hourly for 12 hours. Intraoperatively sedation is graded as follows:

1. Eye opening spontaneously
2. Eye opening to speech
3. Eye opening when shaken
4. Unarousable

Duration of surgery was noted. At the end of surgery, no prophylactic pain relief was given and patients were transferred to post anaesthesia care unit and monitoring was continued for vital parameters, Sedation score and level of sensory blocked was noted every 30 minutes for first 2 hours, every hour for next 12 hours. Duration of sensory blockade was defined as - the time from injection of subarachnoid drug till the level of regression up to L5-S1 and it was assessed by reappearance of sensation on heel and sole of foot.

Postoperative pain was assessed by – Modified objective pain score[11,13], given maximum score of 10.Modified objective pain score is used to assess the pain over 5 min. period every hourly. Higher the score greater the pain experience for the child. When objective pain score is more than 4, end point of observation and rescue analgesic will be given.

Duration of analgesia was considered as interval from time of intrathecal injection to the time of rescue analgesic demanded postoperatively. The total numbers of analgesic doses needed in the first 12 hours were noted. All the patients were observed for any side effects or complications in the post-operative period for 12 hours and following complications if occurred were noted and treated with conventional methods

Hypotension

Fall of blood pressure >20% from baseline was considered as hypotension.

Variable	Score 0	Score 1	Score 2
Crying	None	Consolable	Not consolable
Movement	None	Restless	Thrashing
Agitation	Asleep/calm	Mild	Hysterical
Posture	Normal	Flexed	Holds injury site
Verbal	Asleep/no complain	Complains but cannot localize	Complains can localize

It was treated with intravenous fluid administration, raising the foot end, oxygen inhalation and Vasopressor agents. Physiological impact of sympthectomy is minimal or none in small age groups.[16]

Bradycardia

Fall of heart rate >20% from baseline was considered as bradycardia and was treated with inj. atropine 10 mcg/kg administered intravenously watching for other vital parameters.

Desaturation

Saturation <90% was treated with oxygen supplementation.

High Spinal Level

Urinary retention.

Excessive Sedation

Post-Dural Puncture Headache (PDPH) : For prevention of PDPH – use of smaller gauge spinal needle and good hydration (preoperative and intraoperative) though PDPH is low in pediatric patients. [16,18,19,20]

Transient neurological syndrome or other neurological disorder/deficit.

Results

The present study was conducted in 60 ASA-I paediatric patients undergoing surgeries below T8 dermatome to compare the efficacy, duration, quality of spinal blockade and side effect if any between intrathecal Bupivacaine alone and clonidine added to intrathecal Bupivacaine. Thirty patients were randomly allocated in each of the following two groups.

Demographic profile of the patients is comparable with respect to age and weight. Distribution per ASA status is similar in both the group.

Addition of clonidine to Bupivacaine as an adjuvant result in earlier onset of sensory block(3.1667±1.4162) and more duration of sensory block (168.63±7.0783) compare to Bupivacaine alone i.e. (4.8±1.54) and (110.07 ± 10.8) respectively.[11] All these initial block characteristics turn out to be statistically significant values on comparison i.e. P<0.0000001.

Table 1: Demographic Data and Duration of Surgery

	Age (years)	Weight(kg)	M	f	Duration of surgery
Group A (n=30) (mean±SD)	5.83±2.7678	19.06±6.7565	27	3	46.3±13.1
Group B (n=30) (mean±SD)	6.2±2.329	17.56±6.8101	27	3	52.83±16.272
P value	0.586	0.395	1.000		0.093

For age and weight P > 0.05 non- significant.

Table 2: Comparison of Initial Block Characteristics

	Group-A (n=30) (mean±SD)	Group-B (n=30) (mean±SD)	P value
Onset of sensory block	4.8±1.54	3.1667±1.4162	<0.0000001
Duration of sensory block	110.07±10.8	168.63±7.0783	<0.0000001
Two segment regression	82.3±11.13	112.8±9.58	<0.0000001

P-value < 0.0000001 i.e. highly significant

Table 3: Comparison of Modified Objective Pain Scores between Group A and Group B

Duration	Group A mean±SD	Group B mean±SD	P value	Sign
Shift	0	0	-	NS
30min	0.2333±0.5683	0	0.02836	Sign
1hr	2.266±1.38	0.333±0.711	<0.0000001	Sign
2hr	5.4±1.1919	1.767±1.278	<0.0000001	Sign
4hr	4.3333±1.02833	3.27±1.2	0.0004868	Sign
6hr	3.7±0.7497	2.87±0.78	0.000084	Sign
8hr	3.266±0.5833	2.2±0.71	<0.0000001	Sign
10hr	2.8333±0.5921	1.8±0.48	<0.0000001	Sign
12hr	2.6666±0.6144	1.5±0.51	<0.0000001	Sign

Table 4: Comparison of Sedation Score

	Group A (N=30)		Group B (N=30)		Unpaired t –test	
Time	Mean	SD	Mean	SD	P-Value	Sign.
15 min	0	0	0.266	0.305	<0.005	**Sign.**
20 min	0.1	0.3051	0.7333	0.4498	<0.005	**Sign.**
25 min	0.2	0.407	0.933	0.365	<0.005	**Sign.**
30 min	0.3	0.4661	1.13	0.346	<0.005	**Sign.**
60 min	0.3	0.466	1.2	0.4068	<0.005	**Sign.**
90 min	0	0	1.06	0.254	<0.005	**Sign.**
120min	0	0	0.83	0.379	<0.005	**Sign.**
3 hrs	0	0	0.17	0.38	<0.005	**Sign.**

Table:-5 Post Operative Block Characteristics in Mins

	Group A	Group B	P value
2 segment regression	82.3±11.13	112.8±9.58	<0.0000001
Total duration of post-operative analgesia	191±21.551	365±84.578	<0.0000001
Total no of analgesics in 12 hours	2.4666±0.5074	1.5±0.6297	<0.0000001

Table 6: Comparison of Adverse Effects in Both Groups

Side Effects	Group A	Group B
Bradycardia	1	2
Hypotension	0	2
Nausea/ Vomiting	0	0
High spinal	0	0
PDPH	0	0
Urinary Retention	0	0

The changes in objective pain score for pain were noted. Comparison was done by applying unpaired t 'test. Significant difference was found from 30 min after shifting up to 12 hours. Objective pain score were low in Group B as compared to Group A

The above table shows that, Sedation score is significant right from 15 minutes to 3 hours after subrachanoid block. It is significant statistically. It shows Group B patients are more sedated than Group A patients. Clonidine is a popular sedative agent nowadays. Similar findings are observed in our study. Mean sedation scores were higher in Group B than Group A[10,12,13,14] and significant statistically i.e. P=<0.0000001

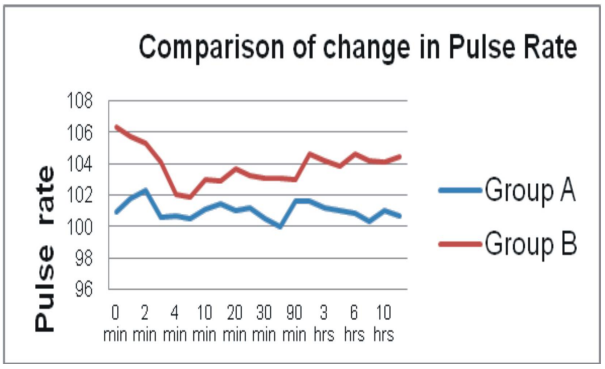
Findings of table 5 reveals statistically significant values on comparison of post operative block characteristics. Among

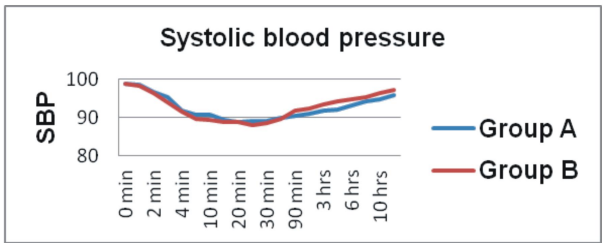
the two groups, Clonidine provided the smooth and prolong postoperative analgesia as compared to Bupivacaine alone.[9,11] The evidence was very much visible in the prolong time to two segmental dermatomal regression [11,13] in Group B i.e. 112.8±9.58.As a result time of rescue analgesia[9,11,13] was comparatively shorter 191±21.551 in Group A than Group B. $p < 0.0000001$.

Table 6 shows the incidence of side effects in all groups. Bradycardia was found in 1 cases of group A and 2 cases of Group B, Hypotension was observed in 0 cases of group A and 2 cases of group B .No patient in any group had nausea/ vomiting, PDPH, urinary retention or high spinal level.

Discussion

The subarachnoid block is a popular, simple and reliable anaesthetic technique for lower abdominal and lower limb surgeries. It has been used widely in clinical practice of anaesthesia because of rapid onset, high reliability and low cost. It produces excellent operating conditions and has high success rate. Though it provides effective analgesia in the initial postoperative period, the effect needs supplementation of potent opioid analgesics systemically to extend the period. Systemic opioids have been associated with respiratory depression, nausea, and vomiting,





itching, and urinary retention. Subarachnoid block last shorter in children than adults because of rapid pharmacokinetics in children as compared to adult. Hence, attempts were made to increase duration of analgesia produced by subarachnoid block by adding various agents intrathecally, like opioids e.g. morphine, buprenorphine, hydromorphone, fentanyl, and non-opioids e.g. ketamine, neostigmine, but none of them have been accepted in clinical practice due to their side effect or non-availability.

Spinal anaesthesia is an excellent option in paediatric population as it provides a rapid onset of profound and predictable uniformly distributed analgesia with good neuromuscular blockade. Paediatric spinal anaesthesia has proven to be a safe alternative to routinely administered general anaesthesia as it avoids the polypharmacy associated with the latter technique and also reduces the incidence of post-operative respiratory complications associated with administration of general anaesthesia. [15] In our study, we evaluate and compare the effects of intrathecal clonidine 1 µg/kg added to hyperbaric Bupivacaine 0.5% and intrathecal Bupivacaine alone on the quality of subarachnoid block, postoperative analgesia and side effects in patients undergoing lower abdominal surgeries. The demographic profile of our patients comparable with respect to age, weight, sex, ASA grading and duration of surgery. Results of study shows that addition of clonidine 1 mcg/kg to Bupivacaine 0.5%

hastens the onset of analgesia, increases the time to regression of sensory block, longer duration of sensory block and decreased need of analgesic. Clonidine has a visible edge over Bupivacaine alone as it enables earlier onset and established a sensory time of block.

The results of our study clearly indicate the effectiveness of intrathecal clonidine as a profound sedative[10,12,13] and the patients were arousable by gentle tactile stimulation. Overall sedation scores was highly significant statistically with administration of clonidine. In all patients spo2 maintained more than 90%.

The group-A shown visible superiority over various post operative block characteristics like regression of sensory block, prolonged post-operative analgesia, lesser amount of analgesic requirement post- operatively. Cardio respiratory parameters as evident from figure 1

Statistically significant difference was not found in two groups in terms of pulse rate throughout the observation period.

Systolic blood pressure in both the groups fell after induction and return back to near preoperative level. Difference of fall in blood pressures between the groups at different time intervals studied was statistically not significant. No patient in any group had nausea, PDPH, vomiting, urinary retention and high spinal level although one case of bradycardia was found in group-A and two cases of bradycardia and two cases of hypotension were found in group-B. These side effects were not significant on statistical comparison

References

1. Chiari A, Eisenach JC. Spinal anesthesia: mechanisms, agents, methods, and safety. *Reg Anesth Pain Med.* 1998; 23(4): 357-62.
2. Racle JP, Benkhadra A, Poy JY, Gleizal B. Prolongation of isobaric bupivacaine spinal anesthesia with epinephrine and clonidine for hip surgery in the elderly. *Anesth Analg.* 1987; 66(5): 442–46.
3. Dobrydnjov I, Samarutel J. Enhancement of intrathecal lidocaine by addition of local and systemic clonidine. *Acta Anaesthesiol Scand.* 1999; 43(5): 556–62.
4. Bonnet F, Buisson VB, Francois Y, Catoire P, Saada M. Effects of oral and subarachnoid clonidine on spinal anesthesia with bupivacaine. *Reg Anesth.* 1990; 15(4): 211–14.
5. Niemi L. Effects of intrathecal clonidine on duration of bupivacaine spinal anaesthesia, haemodynamics, and postoperative analgesia in patients undergoing knee arthroscopy. *Acta Anaesthesiol Scand.* 1994; 38(7): 724–8.
6. Dobrydnjov I, Axelsson K, Samarutel J, Holmstrom B. Postoperative pain relief following intrathecal bupivacaine combined with intrathecal or oral clonidine. *Acta Anaesthesiol Scand.* 2002; 46(7): 806–14.
7. Sethi BS, Samuel M, Sreevastava D. Efficacy of Analgesic Effects of Low Dose Intrathecal Clonidine as Adjuvant to Bupivacaine. *Indian Journal of Anaesthesia.* 2007; 51(5): 415-19.
8. Strichartz G, Berde C. Local Anesthetics. In, Miller RD (ed). Miller's Anesthesia, 6th edition. New York: Churchill Livingstone Inc; 2005, 573-603.
9. Kaabachi O, Ben Rajeb A, Mebazaa M, Safi H, Jelel C, Ben Ghachem M, Ben Ammar M. Spinal anesthesia in children: comparative study of hyperbaric bupivacaine with or without clonidine. *Ann Fr Anesth Reanim.* 2002; 21(8): 617-21.
10. Rochette A, Raux O, Troncin R, Dadure C, Capdevila X.Clonidine prolongs spinal anesthesia in newborns: a prospective dose-ranging study. *Anesth Analg.* 2004; 98(1): 56–9.
11. Kaabachi O, Zaraghouni A, Ouezini R, Abdelaziz AB, Chattaouni O, Kokki H. Clonidine 1ìg/kg is a safe and effective

adjuvant to plain bupivacaine in spinal anesthesa in adolescents. *Anesth Analg.* 2007; 105(2):516-9.

12. Batra YK, Rakesh SV, Panda NB, Lokesh VC, Subramanyam R.Intrathecal clonidine decreases propofol sedation requirements during spinal anesthesia in infants. *Paediatr Anaesth.* 2010; 20(7): 625-32.
13. Cao JP, Miao XY, Liu J, Shi XY.An evaluation of intrathecal bupivacaine combined with intrathecal or intravenous clonidine in children undergoing orthopedic surgery: a randomized double-blinded study. *Paediatr Anaesth.* 2011; 21(4): 399-405.
14. De Sarro GB, Ascioti C, Froio F, Libri V, Nisticò G. Evidence that locus coeruleus is the site where clonidine and drugs acting at alpha 1-and alpha 2-adrenoceptors affect sleep and arousal mechanisms. *Br J Pharmacol.* 1987; 90(4): 675–85.
15. Kokki H, Hendolin H, Vainio J, Partanen J. Comparison of Spinal Anaesthesia and General Anaesthesia. *Anaesthetist.* 1992; 41(12): 765-8.
16. Goyal R, Ginjil K, Baj BB, Singh S, Kumar S. Paediatric spinal anaesthesia. *Indian J Anaesth.* 2008; 52(3): 264–70.
17. Imbelloni LE, Vieira EM, Beato L, Sperni F. Spinal anesthesia for outpatient pediatric surgery in 1 - 5 years old children with 0.5% isobaric enantiomeric mixture of bupivacaine (S75-R25). *Rev Bras Anestesiol.* 2002; 52(3): 286-93.
18. Imbelloni LE, Vieira EM, Sperni F, Guizellini RH, Tolentino P. Spinal anesthesia in children with isobaric local anesthetics:report on 307 patients under 13 years of age. *Paediatr Anaesth* 2006; 16(1): 43–8.
19. Kokki H, Hendolin H, Turunen M. Postdural puncture headache and transient neurologic symptoms in children after spinal anaesthesia using cutting and pencil point paediatric spinal needles. *Acta Anaesthesiol Scand.* 1998; 42: 1076–82.
20. Puncuh F, Lampugnani E, Kokki H. Use of spinal anaesthesia in paediatric patients: a single centre experience with 1132 cases. *Pediatric Anesthesia.* 2004; 14: 564–67.

Case Report

Indian Journal of Anaesthesia and Analgesia
Volume 1 Number 2, July - December 2014

Anaesthetic Management of Massive Necrotizing Fasciitis of Neck with Ludwig's Angina

Deshmukh Ujjwal K.*, Patil Pramod B., Kolhe Manojkumar C.***, Wagh Rahul B.***

Abstract

Anesthetic management of necrotizing fasciitis of neck associated with Ludwig's angina is presented. This case was challenging as all the major vessels and tracheal rings were visible from outside. Also because of massive blood loss patient was in hypovolemic shock. Necrotizing fasciitis is a rare, rapidly progressive, life threatening infection process primarily involving the subcutaneous tissue and fascia with thrombosis of the subcutaneous blood vessels. While Ludwig's angina is a serious, potentially life-threatening infection of floor of the mouth and neck. This condition is notorious for its aggressiveness, rapid progression to airway compromise and high mortality when not treated promptly. These conditions cause severe threat to the patient's life.

Keywords: Necrotizing fasciitis; Ludwig's angina; Hypovolemic shock.

Introduction

Necrotizing fasciitis of neck and Ludwig's angina is a grave emergency due to severe airway compromise and respiratory distress. We report, a rare case of combination of these life threatening conditions for anesthetic management. This case becomes unique as patient was bleeding very profusely through eroded vessels of neck. It is diagnosed by exclusion and has good prognosis with earlier diagnosis.

Case History

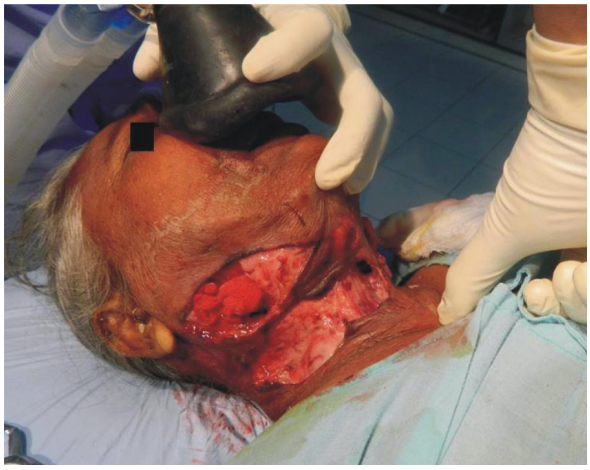
65 years old grossly obese female (BMI=38.7kg/m2) with height of 150 cms weighing 87kgs non diabetic non alcoholic was admitted to the casualty department due to the profuse bleeding through right sided neck vessels with pus draining through site. On examination patient was semiconscious, disoriented and obeying commands intermittently. Her skin was cold clammy, femoral pulse was 140 beats per minute, respiratory rate of 24/ minute and blood pressure was 64/40 mmHg. Mouth opening was 2 cms and Modified Mallampatti's grade was three with restriction of neck movements because of pain. Air entry was reduced in the right lower zone without added sounds. Heart sounds were normal.

Previous history revealed that she was hypertensive since 10 years and was not taking any medications. She had history of left sided hemiplegia 3 years back and currently was not

Author's Affiliations: *Anesthesia Resident (3rd Yr), **Head of Anesthesia Department, ***Tutor, Department of Anesthesia and Critical Care Medicine, A.C.P.M Medical College, Dhule, Maharashtra, India.

Corresponding Author: Dr. Pramod Patil, Flat No.2, Madhurani Apartment, Samrat Nagar, Jamanagiri Road, Dhule 424001, Maharashtra, India.

E-mail : drppatilpub@gmail.com



able to walk with the same leg. Recent history revealed extraction of teeth15 days back followed by appearance of swelling in submandibular region. On admission in casualty department, there was rupture of abscess with drainage of approximately 1400 ml of pus mixed with blood.

Patients both cephalic veins were cannulated at antecubital fossa with 18G cannulae as internal jugular or subclavian vein catheterization was not possible because of infection. 350 ml of whole blood and 300 ml of 3% Hydroxyl Ethyl Starch solution infused within 20 minutes. Amoxicillin plus clavulanic acid antibiotic dose was administered IV. Ryle's tube aspiration was done. Urethral catheterization was done with No. 16 Foley's catheter.

On investigation, hemoglobin was 7gm%, Hct 24%, CBC 16000/cmm BUN 29 & Sr. Creatinine 2.2 mg/dl. Sr. Na 143 & K 4.2 meq/li. Liver function tests were within normal range. EKG was normal. On X ray neck AP view there was no tracheal shift. X-ray chest showed right sided minimal pleural effusion. Cardiac silhouette was within normal limit

Patient was immediately trolleyed to OT anticipating difficult airway and resuscitation. Difficult intubation cart including Rusch tubes of different sizes, LMAs, Bougie, MaCcoy's blade, stubby handle was kept. Emergency tracheostomy back up was confirmed & consent for the same was taken. The patient was preoxygenated for 3 minutes. Then Inj.Glycopyrrolate 0.2mg, inj.Ketamine 60 mg and inj.Midazolam 1mg was given IV during her spontaneous breathing efforts, the ability to ventilate was checked by assisting her breaths.

After the gentle laryngoscopy with no. 3 McIntosh blade, Patient was intubated with no.6 RAE [North Pole] cuffed tube through right nostril. Blind nasal intubation was not tried because of distortion of anatomy. Patient's throat packing was done with wet roller gauze. By the time patients pulse rate was 110/ min, BP 90/50 mmHg, SPO2 99% and EtCO2=30mmHg. She was maintained on O2, Nitrous oxide (33:66%) & sevoflurane 1% with inj. Vecuronium 4 mg as muscle relaxant. Patient was ventilated on Volume control mode with TV= 350ml & RR=12/min. Resuscitation continued with ringer lactate through one cannula and whole blood through other. Urine output throughout the procedure was 200 ml. Total 700ml of whole blood, 300ml of 3% HydroxyEthyl Starch and 1000ml of ringer lactate was infused.

Thorough debridement done for 2 hours and all the bleeding vessels were cauterized. During debridement approximately 700 ml of blood mixed with pus was drained. Patient shifted to the ICU with endotracheal tube in situ with pulse rate of 92/min, BP =108/68mmHg and SPO2=99% with T-piece. Patient was extubated after 24 hours as she fulfilled the weaning criteria. During the ICU stay patient condition were closely monitored. Oxygen supplementation with mask continued. After 6 days of ICU stay patient was shifted to oral surgery ward.

Discussion

While described as far back as the writings of Hippocrates and Galen, the necrotizing fasciitis Ludwig's angina was first detailed by the German surgeon Wilhelm Friedrich von Ludwig in 1836.[1] Necrotizing fasciitis (NF), commonly known as flesh-eating disease or Flesh-eating bacteria syndrome, is a rare infection of the deeper layers of skin and subcutaneous tissues, easily spreading across the facial planes.[2] Necrotizing fasciitis is a quickly progressing and severe disease of sudden onset. It has to be treated immediately with doses of broad spectrum intravenous antibiotics and by surgical treatment.

Type I describes a polymicrobial infection, whereas Type II describes a monomicrobial infection. Many types of bacteria can cause necrotizing fasciitis (e.g., Group A streptococcus (Streptococcus pyogenes), Staphylococcus aureus, Vibrio vulnificus, Clostridium perfringens, Bacteroides fragilis). Such infections are more likely to occur in people with compromised immune conditions like diabetes, immunosuppression, alcoholism/drug abuse, malignancies, and chronic diseases.[3] Most affected patients are in age group of 20 to 60 years, although age range from 12 to 84 has been reported. There is a male predominance (3:1 to 4:1) for these disorders.[4] It occasionally occurs in people with an apparently normal general condition

For an anesthetist the problems regarding Necrotising Fascitis in this case includes to stabilize the patient hemodynamically preoperatively. These patients may be hemodynamically unstable because of severe toxemia and sepsis. During surgery difficult airway, sepsis and renal protection for myoglobinuria are the important issues to be handled. In view of semiconscious patient with fistula in floor of the mouth risk of aspiration is very high. Condition which lead to a compromised airway is a worrisome problem. Condition like can't intubate and can't ventilate is a frightening nightmare for us. Such condition can be encountered due to extensive necrosis of the neck structures. Edema of the neck tissue leads to deviation of the trachea which makes ventilation and intubation difficult.

In view of the compromised airway due to tracheal shift, edema of the neck region and surgical debridement around this area, the case was planned to be conducted under general anesthesia with endotracheal tube in situ. A difficult intubation cart was kept ready. Emergency Tracheostomy consent was taken. Due to tracheal deviation, edema of neck fascia, and the ability to ventilate the patient under anesthesia was questionable. So it was decided to keep patient on spontaneous ventilation till the ability to ventilate was confirmed. These circumstances made Ketamine as the agent of choice due to its ability to maintain spontaneous respiration till deeper plane of anesthesia is achieved5. Ketamine has minimal effects on central respiratory drive as reflected by unaltered response to CO2. In doses up to 2 mg/kg IV transient decrease in tidal volume is seen.[6] Apnea is seen in unusual high doses. Propofol affects respiratory Centre in a manner quantitatively in the same manner as barbiturates. Apnea seen after induction doses.[7] Patient was maintained with sevoflurane 1%, nitrous oxide and oxygen in the ratio of 60:40 on controlled ventilation.[8]

In our case, there were multiple discharging sinuses and one large fistula was present at the floor of mouth. Her oral cavity was flooded with blood and pus. Airway was thoroughly suctioned

before and at the time of laryngoscopy. Blind nasal intubation is not a good option in these cases because of the distortion of the airway and fragile tissues of the nasopharyngeal airway. Awake fiber-optic intubation would have been the ideal management for this patient to intubate the trachea because under anesthesia there are high chances that patient may obstruct and ventilation may not be possible. But as there was bleeding and pus pouring out from multiple discharging sinuses at the floor of mouth which would have obstructed the view of fibreoptic bronchoscope. As mouth opening was adequate, we decided to perform direct laryngoscopy and intubation was done.

Differential Diagnosis of these conditions includes:

1. Peritonsillar abscess
2. Parotid space infection
3. Mumps
4. Parapharyngeal or retropharyngeal space infection
5. Paravertebral space infection
6. Suppurative jugular thrombophlebitis.[9]

Mortality rates have been noted as high as 73 percent if left untreated. Without surgery and medical assistance, the infection will rapidly progress and will eventually lead to death.[10]

References

1. Tshiassny K. Ludwig's angina: an anatomic study of the lower molar teeth in its pathogenesis.
2. Rapini, Ronald P, Bolognia, Jean L, Jorizzo, Joseph L. Dermatology: 2-Volume Set. St. Louis: Mosby; 2007. ISBN 1-4160-2999-0.9
3. Kotrappa KS, RS Bansal, NM Amin. Necrotizing fasciitis. *American Family Physician*. 1996-04; 53 (5): 1691–1697. ISSN 0002-838X.
4. Nguyen VD, Potter JL, Hersh-Schick MR. Ludwig angina:an uncommon and potentially lethal neck infection. *AJNR Am Neuroradiol.* 1992; 13: 2.
5. Ventilatory Response to CO2 Following Intravenous Ketamine in Children. *Anesthesiology*. 1989; 70: 422-425.
6. Miller. Anesthesia 7th edition. 1: 745-746.
7. Miller. Anesthesia 7th edition. 1: 724-725.
8. Miller. Anesthesia 7th edition. 1: 724-7259.
9. Abramowicz S, Abramowicz JS, Dolwick MF. Severe life threatening maxillofacial infection in pregnancy presented as Ludwig's angina. *Infect Dis Obstet Gynecol*. 2006; doi: 10.1155/IDOG/2006/51931. http://www.medscape.com/viewarticle/444061 Necrotizing Fasciitis (Flesh-Eating Bacteria syndrome)

Case Report

Indian Journal of Anaesthesia and Analgesia
Volume 1 Number 2, July - December 2014

Central Neuraxial Block for Renal Transplant in a Patient with Ventricular Septal Defect

K.K. Mubarak*, Arun Kumar P.**

Abstract

We report a case of an adult male patient with end stage renal disease having a congenital ventricular septal defect (VSD) who underwent renal transplant. The procedure was carried out under central neuraxial block- combined sub arachnoid and epidural block. Perioperative period was uneventful with good postoperative graft functioning.

Keywords: Central neuraxial blockade; Renal transplant; Venticular septal defect.

Introduction

Congenital heart diseases (CHD) are among the most common inborn defects, of which VSD is the commonest[1]. There is increasing incidence of adult patients with congenital heart diseases presenting for non cardiac surgeries. With the incidence of renal disease on the rise, renal transplant surgery is now becoming common. We report the successful management of a patient with a ventricular septal defect for elective renal transplantation surgery under central neuraxial block-combined sub arachnoid and epidural block.

Case Report

A 30 year old male presented for renal transplant surgery, with end stage renal disease resulting from membranoproliferative glomerulonephritis. Patient gave history of a cardiac problem being detected in childhood, but no further details were available. There was no history suggestive of failure to thrive, recurrent respiratory infections, effort intolerance, cyanotic spells or developmental delay

The patient consulted a doctor one year back for nausea and vomiting and was diagnosed to have end stage renal disease, for which dialysis was initiated. He underwent right nephrectomy four months before the transplant for a pseudoaneurysm bleed, which was done under general anaesthesia plus epidural block, perioperative period of which was uneventful.

On examination, he was moderately built and nourished. Height was 168cm, weight 57kg, Body Mass Index 20.2. He had a central catheter in the internal jugular vein for dialysis. He was pale, pulse rate 78 per minute, regular and blood pressure 130/80 mm Hg. Cardiovascular examination revealed a hyperdynamic chest, apex beat in the left 6thintercostal space, just outside mid clavicular line. There was a thrill along the left sternal border, with a grade 4

Author's Affiliations: *Professor & Head of the Dept., **Junior Resident, Dept. of Anaesthesiology, Government Medical College, Kozhikode, Kerala 673008, India

Corresponding Author: Dr. K.K. Mumbarak, Professor & Head of the Dept., Government Medical College, Kozhikode, Kerala 673008, India.

E-mail: mubarakdr@yahoo.co.in

pansystolic murmur along the left sternal border.

On investigation, hemoglobin was 7.2g/dL, blood urea 51mg/dL and serum creatinine 6.6 mg/dL. Chest Xray showed cardiomegaly. ECG showed right bundle branch block and left ventricular hypertrophy.

Echocardiography revealed a 7 mm perimembraneousventricular septal defect with left to right shunt, partially closed by septal tricuspid leaflet, with a pressure gradient of 120 mmHg, and mild pulmonary artery hypertension.

Patient was dialysed on the day before the surgery. Infective endocarditis prophylaxis was given.

On morning of surgery, repeat investigation showed no significant variations from baseline values.Oral ranitidine 150 mg and metoclopromide 10 mg were given.

In the operation theatre, non invasive blood pressure, ECG and pulse oxymeter were attached. Oxygen was given at 5L/min via face mask. IV access via two 18G cannulae, one each in the right and left forearms, and a normal saline infusion was started. Patient was pre medicated with intravenousfentanyl 60 mcg, ondanseteron 4 mg and midazolam 1.5 mg.

Epidural catheter was placed in the L1-L2 space by loss of resistance technique. Test dose was given with 3 ml lignocaine with 1:2 Lakh adrenaline after negative aspiration for blood and CSF and position of catheter confirmed. Subarachnoid block was given using a 27 G Quinke needle in the L3-L4 space with 2.5ml hyperbaric bupivacaine 0.5%. a sensory block up to T4 level was attained. A 45 cm peripherally inserted cental venous catheter was introduced through the left basilic vein under local anaesthetic. Baseline CVP was 11 cm H2O.

Forced air body warmer was used and pressure points padded, and procedure was started. After one hour, epidural anaesthesia was supplemented with 2%lignocaine with 1:200,000 adrenaline, given as 2 ml boluses every 10 minutes, to maintain a sensory block level of T4.Vitals remained stable and surgical conditions were good. Before vascular anastamosis, IV normal saline was administered in for maintenance requirement. Rate of fluid administration was increased after anastamosis was established, with monitoring of CVP, which was maintained between 12 and 15 cm H_2O. A total of 2500ml normal saline was administered. After anastamosis of ureter, a urine output of 600 ml/hr was observed. Vitals remained stable intra operatively.

After the procedure, patient was shifted to post anaesthesia care room and analgesia was provided with 0.125% bupivacaine at 5 ml/hr via elastomeric epidural pump. Post operative period was uneventful and patient was shifted to renal transplant ICU and recovered well.

Discussion

Renal transplantation was first attempted in 1906[2], but the first successful procedure took place in 1954. [3] Over time, the evolution of medical science involving immunosuppressant, surgical and anaesthetic techniques have made this complex procedure into an almost routine one in today's tertiary centers.

End stage renal disease in defined as a glomerular filtration rate of less than 15ml/1.73 sq m.[4] Among the commonest etiologies are Type 2 diabetes mellitus(44%),IgA nephropathy& chronic glomerulonephriitis among others.[5] Renal failure produces detrimental effects on various organ systems, like hypertension, ischemic heart disease,

autonomic neuropathy, anemia, coagulopathy, pleural effusion,increased susceptibility to infections, acid base disturbances and electrolyte abnormalities to name a few.[6] In addition these patients are often on multiple drugs which may need to be stopped or modified prior to the procedure. Pre operative haemodialysis is usually carried out within 24 hrs prior to the procedure to minimize the acid base disturbances and electrolyte abnormalities and optimize the fluid load.

Anaesthetic goals in a renal transplant surgery include proper pre operative assessment and optimization of fluid and electrolyte status, avoiding nephrotoxic drugs, preventing hypoxia and hypotension, maintaining good renal perfusion in the transplanted kidney, providing optimal surgical conditions and adequate analgesia. Stress response to laryngoscopy and intubation should be minimised. The clearance of anaesthetic drugs such as opioids and non depolarizing muscle relaxants are reduced and may warrant a reduction in dosage and/or careful administration. Central venous pressure is commonly used as a guide to fluid administration. Although earlier high central venous pressures were recommended, recent evidence points that a CVP of 7 to 9 mm Hg may be enough for optimal graft performance.[7] Blood pressure should be closely monitored and hypotension avoided.

VSD is the commonest congenital cardiac anomaly (20%).[8] Most of these defects close by about 2 years of age and up to 90% close by the age of 10. Perimembraneous defects are the commonest, constituting 80% of all VSDs[9]. Smaller defects may produce few symptoms and may go un-noticed. Larger ones may present as recurrent respiratory tract infections, failure to thrive, or cardiac failure. Smaller VSD's may require only follow up and antibiotics, but larger ones have to undergo surgical closure. If the defect is small, there is only a minimal increase in pulmonary blood flow. Large defects on the other hand are associated with equalization of ventricular pressures and initially a marked increase in pulmonary blood flow consequent on the low resistance of the pulmonary circulation. With time, pulmonary vascular resistance (PVR) starts to rise, accompanied by a reduction in shunt flow and, if left untreated, Eisenmenger's physiology will develop. Moderate shunts may increase if SVR increases due to pain and catecholamine release. There is also a risk of endocarditis even in smaller lesions.

As an anaesthesiologist, one must ensure that the systemic vascular resistance(SVR) does not fall drastically, and avoid factors which increase pulmonary vascular resistance.(for eg:high airway pressure, acidosis, hypoxemia, hypercarbia) while optimizing oxygen delivery.

When anesthetizing patients with congenital heart disease, under either a regional technique or general anesthesia, the following factors must be kept in mind; prevention of accidental intravenous infusion of air bubbles by using loss of resistance to saline rather than air to identify the epidural space, a slow onset of epidural analgesia is useful, as rapid fall in SVR could result in reversal of shunt with hypoxaemiaor paradoxical emboli. Low blood pressure would also decrease renal perfusion. There was also the likelihood of uremic coagulopathy increasing the chances of bleeding.

By using central neuraxial block, exposure of the patient to multiple anaesthetic drugs could be avoided while the patient's renal clearance was in a compromised state. The stress response of laryngoscopy and intubation could be avoided. In addition, the use of regional

technique is more cost effective. The placement of an epidural catheter enables the slow onset of anaesthesia, avoiding hypotension. Keeping the epidural catheter in situ also enables us to provide effective postoperative analgesia and facilitate early ambulation. Keeping these factors in mind, with all the coagulation parameters normal, we decided to go with central neuraxial block-combined spinal epidural anaesthesia. As the block was established carefully, no significant fall in blood pressure was observed. Patient was comfortable throughout the surgery. Surgical conditions were good and adequate renal output was present. The epidural catheter was used to administer postoperative analgesia in a continuous manner by the use of an epidural pump. The graft function was excellent and the patient recovered well. The epidural catheter was removed on the third postoperative day. He was shifted out of the post transplant ICU on the fifth postoperative day and the rest of his hospital stay was uneventful.

Conclusion

With careful pre operative assessment, a well planned anaesthetic technique and good monitoring, central neuraxial block-combined spinal epidural anaesthesia was used as a safe anaesthetic technique for renal transplant surgery in an adult patient with ventricular septal defect.

References

1. Hoffman JI, Kaplan S. The incidence of congenital heart disease. *Journal of the American College of Cardiology.* 2002; 39(12): 1890–900.
2. Morris PJ. Transplantation—a medical miracle of the 20th century. *N Engl J Med.* 2004; 351: 2678-80.
3. Merrill JP, JE, Harrison JH, Guild WR. Successful homotransplantation of the human kidney between identical twins. *J Am Med Assoc.* 1956; 160: 277-82.
4. Collins B, Johnston T. Renal Transplanation: Urology. Oct 2009.
5. BJA CEPD Reviews-2001-Rabey-24-7.
6. Rang S, West N, Howard J, Cousins J. Anaesthesia for Chronic Renal Disease and Renal Transplantation: European Association of Urology and European Board of Urology Update series 4. 2006: 246-256.
7. De Gasperi A, Narcisi S, *et al*. Periopertive fluid management in kidney transplantation: is volume overload still mandatory for graft function? *Transplant Proc.* 2006; 38: 807-9.
8. Meberg A, Otterstad JE, Frøland G, Søarland S, Nitter-Hauge S. Increasing incidence of ventricular septal defects caused by improved detection rate. *Acta Pædiatrica.* 1994; 83(6): 653–657.
9. Waight David J, Bacha Emile A, Kahana Madelyn, Cao Qi-Ling, Heitschmidt Mary, Hijazi Ziyad M. Catheter therapy of Swiss cheese ventricular septal defects using the Amplatzer muscular VSD occluder. *Catheterization and Cardiovascular Interventions.* 2002; 55(3): 355–361.

Indian Journal of Anaesthesia and Analgesia
Volume 1 Number 2, July - December 2014

Highest in Hierarchy of Evidence: What does Systematic Reviews and Meta-Analyses on Diabetic Peripheral Neuropathy Inform us about Pain?

Kumar Senthil P.*, Adhikari Prabha, Jeganathan P.S.*****

Abstract

This short communication was aimed at re-exploring the evidence contribution provided by systematic reviews and meta-analyses on pain in diabetic peripheral neuropathy (DPN) in order to provide implications for anesthetic and analgesic management. Existing evidence though limited provide sufficient information on epidemiology of DPN with prevalence rates ranging between 26-47%;annual pain medication costs of $1,004 per DPN patient;duloxetine, gabapentin, alpha lipoic acid and pregabalin were effective drugs; and consensus guidelines recommended that choice for treatment must also include consideration of adverse effects, individual patient factors such as comorbidities, and often cost.

Keywords: Levels of evidence; Diabetic neuropathy; Neuropathic pain; Evidence-informed pain management; Neuroanesthesiology.

This short communication was aimed a re-exploring the evidence contribution provided by systematic reviews and meta-analyses on pain in diabetic peripheral neuropathy (DPN) in order to provide implications for anesthetic and analgesic management.

Barrett *et al*[1] reviewed the literature examining the epidemiology, quality of life burden, cost, and treatment of diabetic peripheral neuropathy pain (DPNP) through comprehensive computerized literature review of MEDLINE and other databases, which resulted in 321 articles. The prevalence rates ranged between 26-47%., two drugs have been approved by U.S. Food and Drug Administration, DPNP impairs quality of life and one study estimated average annual pain medication costs of $1,004 per DPNP patient.

Many systematic reviews and meta-analyses were on oral pharmacological interventions as he one by Adriaensen *et al*[2] who evaluated the efficacy and safety of oral treatments for DPN in their systematic review of placebo-controlled trials and found that Gabapentin, lamotrigine, tramadol, oxycodone, mexiletine and acetyl-L-carnitine were reported for their efficacy and tolerability.Gabapentin was found to be a first choice treatment in painful diabetic neuropathy, especially in the elderly.

Pluijms *et al*[3] detailed

Author's Affiliations:
*Professor, Maharishi Markandeshwar Institute of Physiotherapy and Rehabilitation (Maharishi Markandeshwar University), Mullana- Ambala, Haryana, **Professor, Dept. of Medicine, ***Professor, Dept. of Physiology, Kasturba Medical College (Manipal University), Mangalore, India.

Corresponding Author: Senthil P. Kumar, Professor, Maharishi Markandeshwar Institute of Physiotherapy and Rehabilitation (Maharishi Markandeshwar University), Mullana- Ambala, Haryana, India.

E-mail: senthilparamasivamkumar@gmail.com

the National Institute for Health and Clinical Excellence guidelines for the treatment of painful diabetic neuropathy and opined that "treatment should start with duloxetine or amitriptyline if duloxetine is contraindicated. If pain relief is inadequate, monotherapy with amitriptyline or pregabalin, or combination therapy with amitriptyline and pregabalin should be considered. If pain relief is still insufficient, tramadol instead of or in combination with a second-line agent should be considered. In patients who are unable to take oral medication, topical lidocaine can be considered for localized pain.

Mijnhout *et al*[4] in their systematic review identified studies on effectiveness of alpha lipoic acid by searching MEDLINE and EMBASE and found five RCTs and one meta-analysis which unanimously reported significant improvement in the total symptom score (TSS) when ALA was administered intravenously at a dosage of 600 mg once daily over a period of three weeks.

Four systematic reviews were on Duloxetine: Hall *et al*[5] pooled data from three double-blind, randomized studies on 1139 patients (339 placebo; 800 duloxetine) and 867 patients (287 routine-care; 580 duloxetine) in the acute and extension phases, respectively. Duloxetine was found to be safe and well tolerated, with the three most commonly reported TEAEs being nausea, somnolence and constipation.

Crucitti *et al*[6] evaluated effects of Duloxetine in their meta-analysis and found no short-term improvements in FPG and HbA(1c) compared to placebo, but in the 41-week (n = 181), small and significant long-term improvements was seen in duloxetine-treated patients. Kajdasz *et al*[7] also performed a post hoc analysis to summarize the efficacy and tolerability of duloxetine using number needed to treat (NNT) and number needed to harm (NNH) from three 12-week, multicenter, randomized, double-blind, placebo-controlled, parallel-group studies and found that patients receiving duloxetine had NNT of 5 and NNH of 8.8-17.5 which suggested that duloxetine was effective and well tolerated for the management of DPNP.

Duloxetine was compared with pregabalin and gabapentin, and Quilici *et al*[8] conducted an indirect meta-analysis to compare the efficacy and tolerability of duloxetine (DLX), pregabalin (PGB), gabapentin (GBP) and amitriptyline (AMT), using placebo as a common comparator by searching PubMed, EMBASE, CENTRAL Three studies of DLX, six of PGB, two of GBP and none of AMT found all were superior to placebo for all efficacy parameters, with some tolerability trade-offs.

Roth *et al*[9] reviewed nine clinical trials on efficacy and safety of pregabalin in painful diabetic peripheral neuropathy and postherpetic neuralgia by searching MEDLINE and ISI Web of Knowledge and on a total of 2399 patients, Pregabalin (150-600 mg/day) significantly reduced pain and improved pain-related sleep interference.

Sultan *et al*[10] investigated the efficacy of duloxetine in painful diabetic neuropathy and fibromyalgia by searching PubMed, EMBASE (via Ovid), and Cochrane CENTRAL and identified six trials with 1,696 patients: 1,510 were treated with duloxetine and 706 with placebo. The number needed to treat (NNT) for at least 50% pain relief was 6.

Argoff *et al*[11] reviewed the evidence and provided consensus guidelines for treatments and found two agents, duloxetine and pregabalin, were formally approved by the Food and Drug Administration for the treatment of DPNP. The choice for treatment must also include consideration of adverse effects,

individual patient factors such as comorbidities, and often cost.

Existing evidence though limited provide sufficient information on epidemiology of DPN with prevalence rates ranging between 26-47%; annual pain medication costs of $1,004 per DPN patient; duloxetine, gabapentin, alpha lipoic acid and pregabalin were effective drugs; and consensus guidelines recommended that choice for treatment must also include consideration of adverse effects, individual patient factors such as comorbidities, and often cost.

References

1. Barrett AM, Lucero MA, Le T, Robinson RL, Dworkin RH, Chappell AS. Epidemiology, public health burden, and treatment of diabetic peripheral neuropathic pain: a review. *Pain Med.* 2007; 8(Suppl 2): S50-62.
2. Adriaensen H, Plaghki L, Mathieu C, Joffroy A, Vissers K. Critical review of oral drug treatments for diabetic neuropathic pain-clinical outcomes based on efficacy and safety data from placebo-controlled and direct comparative studies. *Diabetes Metab Res Rev*. 2005; 21(3): 231-40.
3. Pluijms W, Huygen F, Cheng J, Mekhail N, van Kleef M, Van Zundert J, van Dongen R. Evidence-based interventional pain medicine according to clinical diagnoses. 18. Painful diabetic polyneuropathy. *Pain Pract*. 2011; 11(2): 191-8.
4. Mijnhout GS, Alkhalaf A, Kleefstra N, Bilo HJ. Alpha lipoic acid: a new treatment for neuropathic pain in patients with diabetes? *Neth J Med*. 2010; 68(4): 158-62.
5. Hall JA, Wang F, Oakes TM, Utterback BG, Crucitti A, Acharya N. Safety and tolerability of duloxetine in the acute management of diabetic peripheral neuropathic pain: analysis of pooled data from three placebo-controlled clinical trials. *Expert Opin Drug Saf*. 2010; 9(4): 525-37.
6. Crucitti A, Zhang Q, Nilsson M, Brecht S, Yang CR, Wernicke J. Duloxetine treatment and glycemic controls in patients with diagnoses other than diabetic peripheral neuropathic pain: a meta-analysis. *Curr Med Res Opin*. 2010; 26(11): 2579-88.
7. Kajdasz DK, Iyengar S, Desaiah D, Backonja MM, Farrar JT, Fishbain DA, Jensen TS, Rowbotham MC, Sang CN, Ziegler D, McQuay HJ. Duloxetine for the management of diabetic peripheral neuropathic pain: evidence-based findings from post hoc analysis of three multicenter, randomized, double-blind, placebo-controlled, parallel-group studies. *Clin Ther*. 2007; 29(Suppl 2): 536-46.
8. Quilici S, Chancellor J, Löthgren M, Simon D, Said G, Le TK, Garcia-Cebrian A, Monz B. Meta-analysis of duloxetine vs. pregabalin and gabapentin in the treatment of diabetic peripheral neuropathic pain. *BMC Neurol*. 2009; 9: 6.
9. Roth T, van Seventer R, Murphy TK. The effect of pregabalin on pain-related sleep interference in diabetic peripheral neuropathy or postherpetic neuralgia: a review of nine clinical trials. *Curr Med Res Opin*. 2010; 26(10): 2411-9.
10. Sultan A, Gaskell H, Derry S, Moore RA. Duloxetine for painful diabetic neuropathy and fibromyalgia pain: systematic review of randomised trials. *BMC Neurol*. 2008; 8: 29.
11. Argoff CE, Backonja MM, Belgrade MJ, Bennett GJ, Clark MR, Cole BE, Fishbain DA, Irving GA, McCarberg BH, McLean MJ. Consensus guidelines: treatment planning and options. Diabetic peripheral neuropathic pain. *Mayo Clin Proc*. 2006; 81(4 Suppl): S12-25.

Indian Journal of Anesthesia and Analgesia

Library Recommendation Form

If you would like to recommend this journal to your library, simply complete the form below and return it to us. Please type or print the information clearly. We will forward a sample copy to your library, along with this recommendation card.

Please send a sample copy to:

Name of Librarian

Library

Address of Library

Recommended by:

Your Name/ Title

Department

Address

Dear Librarian,

I would like to recommend that your library subscribe to the **Indian Journal of Anesthesia and Analgesia**. I believe the major future uses of the journal for your library would be:

1. As useful information for members of my specialty.
2. As an excellent research aid.
3. As an invaluable student resource.
4. **I have a personal subscription and understand and appreciate the value an institutional subscription would mean to our staff.**
5. Other

Should the journal you're reading right now be a part of your University or institution's library? To have a free sample sent to your librarian, simply fill out and mail this today!

Stock Manager

Red Flower Publication Pvt. Ltd.

48/41-42, DSIDC, Pocket-II, Mayur Vihar, Phase-I

Delhi - 110 091 (India)

Tel: 91-11-22754205, 45796900, Fax: 91-11-22754205

E-mail: redflowerppl@gmail.com, redflowerppl@vsnl.net

Website: www.rfppl.co.in

Subscription Form

I want to renew/subscribe to international class journal **"Indian Journal of Anesthesia and Analgesia"** of Red Flower Publication Pvt. Ltd.

Subscription Rates:
• India: Institutional: Rs.4000, Individual: Rs.1000, Life membership (10 years only for individulas) Rs.5000.
• All other countries: $600

Name and complete address (in capitals):

Payment detail:
Demand Draft No.
Date of DD
Amount paid Rs./USD

1. Advance payment required by Demand Draft payable to Red Flower Publicaion Pvt. Ltd. payable at Delhi.
2. Cancellation not allowed except for duplicate payment.
3. Agents allowed 10% discount.
4. Claim must be made within six months from issue date.

Mail all orders to
Red Flower Publication Pvt. Ltd.
48/41-42, DSIDC, Pocket-II, Mayur Vihar Phase-I, Delhi - 110 091 (India)
Tel: 91-11-22754205, 45796900, Fax: 91-11-22754205
E-mail: redflowerppl@vsnl.net, redflowerppl@gmail.com
Website: www.rfppl.co.in

Call for Reviewers

Indian Journal of Anesthesia and Analgesia (IJAA) (ISSN 2349-8471) is official peer-reviewed scientific journal addresses all aspects of anesthesia practice, including anesthetic administration, pharmacokinetics, preoperative and postoperative considerations, coexisting disease and other complicating factors, cost issues, and similar concerns anesthesiologists contend with daily. The Journal seeks a balance between outstanding basic scientific reports and definitive clinical and management investigations. The Journal welcomes manuscripts reflecting rigorous analysis, even if unusual in style and focus.

Readership: Anaesthesiologists, Critical Care Physicians, Surgeons.

One must have at least five years of experience in the field after completion of the education in that field and at least five original research papers in journal(s).

Please note that the acceptance of your application will be at the sole discretion of the editors.

Please provide your complete information and affiliation in brief through e-mail or you can register your self on our website www.rfppl.org.

For more information, please contact:

Publication–in-charge

Red Flower Publication Pvt. Ltd.

48/41-42, DSIDC, Pocket-II

Mayur Vihar Phase-I

Delhi – 110 091, India

Phone: 91-11-22754205, 45796900, Fax: 91-11-22754205

E-mail: redflowerppl@vsnl.net, redflowerppl@gmail.com

Website: www.rfppl.co.in

Instructions to Authors

Submission to the journal must comply with the Guidelines for Authors.

Non-compliant submission will be returned to the author for correction.

To access the online submission system and for the most up-to-date version of the Guide for Authors please visit:

http://www.rfppl.co.in

Technical problems or general questions on publishing with ***IJAA*** are supported by Red Flower Publication Pvt. Ltd's Author Support team (http://ww.rfppl.co.in)

Alternatively, please contact the Journal's Editorial Office for further assistance.

Publication -in-Charge

Indian Journal of Anesthesia and Analgesia

Red Flower Publication Pvt. Ltd.

48/41-42, DSIDC, Pocket-II

Mayur Vihar Phase-I

Delhi – 110 091

India

Phone: 91-11-22754205, 45796900, Fax: 91-11-22754205

E-mail: redflowerppl@gmail.com, redflowerppl@vsnl.net

Website: www.rfppl.co.in

STATEMENT ABOUT OWNERSHIP AND OTHER PARTICULARS ABOUT "Indian Journal of Anesthesia and Analgesia" (See Rule 8)

1. Place of Publication	:	Delhi
2. Periodicity of Publication	:	Quarterly
3. Printer's Name	:	**Asharfi Lal**
Nationality	:	Indian
Address	:	3/258-259, Trilok Puri, Delhi-91
4. Publisher's Name	:	**Asharfi Lal**
Nationality	:	Indian
Address	:	3/258-259, Trilok Puri, Delhi-91
5. Editor's Name	:	**Asharfi Lal** (Editor-in-Chief)
Nationality	:	Indian
Address	:	3/258-259, Trilok Puri, Delhi-91
6. Name & Address of Individuals who own the newspaper and particulars of shareholders holding more than one percent of the total capital	:	**Asharfi Lal** 3/258-259, Trilok Puri, Delhi-91

I Asharfi Lal, hereby declare that the particulars given above are true to the best of my knowledge and belief.

Sd/-
(Asharfi Lal)

Subject Index

Author Index