Vol. 88,89(1,2)

www.aaarnaccm.com

160

ISSN 0301-0368
Jan - Dec. 2021

INDIA

ASIAN ARCHIVES OF ANAESTHESIOLOGY AND RESUSCITATION

Indexed in: MedIndia, Indian Citation Index, HUG-Services d'anesthesiologie, World cat Research bible, Open Med, Indian Medical Journals

ASIAN ARCHIVES OF ANAESTHESIOLOGY AND RESUSCITATION

Office Address : Room No. D-523, Department of Anaesthesia and Intensive Care ,
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ANAESTHESIA & ALLIED SCIENCES
FOR PARAMEDICS

A Comprehensive textbook of Anaesthesia, Intensive Care, Anatomy, Physiology, Biochemistry, Pharmacology, Pathology and other Special topics

(A Textbook for B.Sc. Operation Theater Students, Trauma Technicians, Nurses, Physiotherapists)

'ANAESTHESIA AND ALLIED SCIENCES FOR PARAMEDICS' is first book of its kind that comprises of six sections. The section one consists of anatomy, physiology and biochemistry for paramedics. The details of all muscles, their actions, nerves and vessels are compiled in tabular form so that it is easily learnt and recapitulated by students. Essential physiology and clinical biochemistry are concised subsections of this section.

The second section provides details of anaesthesia and its various sub-specialities. This section has several chapters and starts from history of anaesthesia till modular operation theatre suit details.

Third section, 'Drugs and Pharmacology' provides details of all the anaesthesia and emergency drugs. Section four covers all the instruments which are used in anaesthetic practice including anaesthesia machine to Automated External Defibrillator. The details of instruments will be very beneficial for the students during examinations and table viva.

Fifth section provides knowledge of unique topics of modern anaesthetic practices that need utmost attention in day - to - day life. The sixth section is a final section highlights all the scoring systems and grading in anaesthesia.

This book will be extremely useful to all paramedics i.e BSc Medical Technology students, operation theatre technicians nurses, physiotherapists and trauma technicians, in all types of examinations, skill development and knowledge augmentation.

The book is a sincere tribute to my father who had this dream for me. I am fortunate enough to have blessings from Almighty, my teachers and parents. All the contributors of this book have provided me a great support and deserve my heartfelt gratitude.

About The Editor

Dr Manpreet Singh is a graduate and post-graduate from Jawaharlal Nehru Medical College, Aligarh. He worked at University College of Medical Sciences and GTB Hospital , Delhi in various capacities as Senior Resident, Sr. Research Associate and Specialist Consultant in Department of Anaesthesia and Critical Care. He has done various fellowships and courses related to Emergency Medicine, Critical Care and Emergency Life Support and is a Fellow of Chest Care Physician (USA), Fellow of Academic College of Emergency Experts in India and Fellow of International Medical Sciences Academy(FIMSA) .

He is an instructor and provider of various courses in India like Advanced Cardiac Life Support (through American Heart Association), Fundamental Critical Care Support , Paediatric and Neonatal Life Support, Trauma Life Support and Advanced Ultrasound trauma Life Support. He is a certificate holder of 'Basic Law and Medicine' (Mumbai) and National Disaster Management (NIDM).He is a course coordinator of various workshops and training courses in Community CPR, Community Trauma and Training & Airway Management courses along with many eminent teachers all over India.

He is a member of more than 10 international and national professional societies, has written more than 52 research papers and presented more than 65 research papers or lectures as invited faculty in various national and international conferences. He is a co-editor of two national journals and reviewer of 8 indexed and non-indexed journals.

Currently, he is Assistant Professor in Department of Anaesthesia and Intensive Care, Govt. Medical College and Hospital-32, Chandigarh .His exceptional skills as a writer ,speaker and editor have been reflected in all major conferences, workshops and publications. His colleagues hold him in high esteem for his academic and professional excellence. Presently he is involved in teaching the students of BSc Medical Technology and Operation Theatre, Trauma Technician course, MBBS and MD (Anaesthesiology).

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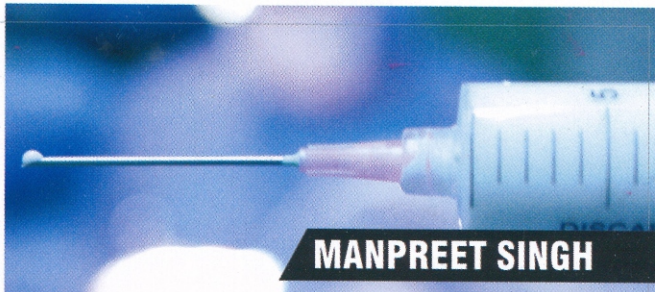
MANPREET SINGH



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Asian Archives of Anaesthesiology and Resuscitation

1970-2021

The Official Journal of "Anaesthesiology and Resuscitation Research Forum"

Vol. 160 (88,89) (1,2) **Jan-Dec.2021**

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Published and Printed by Dir. Prof. U.C. Verma on behalf of Asian Archives of Anaesthesiology and Resuscitation, Official Address : Room No. D-523, Department of Anaesthesia and Intensive Care , Level 5 Block D, Government Medical College and Hospital, Sector 32 , Chandigarh, India.
Mobile no. 9646121503 | E Mail: aaarjournal@gmail.com
Typeset and printed at Neo Print India, Sector 32-D, Chandigarh - 160030

ASIAN ARCHIVES OF ANAESTHESIOLOGY AND RESUSCITATION

Official Address : Room No. D-523, Department of Anaesthesia and Intensive Care , Level 5 Block D, Government Medical College and Hospital, Sector 32 , Chandigarh, India.

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A SINGLE-CENTRE CASE SERIES ASSESSING THE AMBU ASCOPE3® FOR AWAKE NASOTRACHEAL INTUBATION IN PATIENTS WITH ORO-FACIALMALIGNANCY HAVING LIMITED MOUTH OPENING.

Shahna Ali[1], S M Arman[2], Obaid Ahmad Siddiqui[3], Manazir Athar[4], Dr. Faiqa Rahman[5]

ABSTRACT

Difficult intubation often leads to significant mortality and morbidity in anaesthesia. Awake fibreoptic intubation (FOI) has always been the gold standard for managing difficult airway. However, the fibre optic device is costly, cumbersome to carry around hence a single-use flexible video scope has been developed (Ambu aScope 3®). We aimed to evaluate the Ambu aScope3® system in patients with difficult airways and record anaesthesiologists' satisfaction.

10 adult patients with oro-facial malignancy posted for elective surgery with reduced Inter Incisor Distance (<4cm) were intubated under the combination of topical airway anaesthesia with IV sedation technique. Awake Ambu aScope3® guided nasotracheal intubation was done. After successful intubation, all the anaesthesiologists were required to fill a questionnaire form and rate their experience on a 5 point Likert scale.

It was concluded that new Ambu aScope 3® may be a valuable alternative to traditional fibreoptic bronchoscope.

Keywords : intubation, airway management, laryngoscopy, Ambu aScope

Introduction:

Difficult intubationfrequently leads tosignificant mortality and morbidity in anaesthesia.Growth in the orofacial region limits mouth opening, leading to difficulty in intubation. In such situations of minimum mouth opening, video-assisted intubating devices prove to be superior to conventional intubating devices. The answer to anticipated difficult airway has always been awake fibreoptic intubation (FOI) .However, the fibre optic device is costly, cumbersome to carry around and time taking to set up before use. To overcome these problems, a single-use flexible video scope has been developed (Ambu aScope3®) with a better quality optical system to aid tracheal intubation. We aimed to evaluate the Ambu aScope3® system in patients with difficult airways requiring awake nasotracheal intubation having orofacial malignancy and record anaesthesiologist's satisfaction.

Methods:

10 adultpatients, American Society of Anaesthesiologists (ASA) Physical Status Classification System I and II status with orofacial malignancy and reduced Inter Incisor Distance (IID) ≤ 40 mm were selected over a period of four

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months (Dec 2019- March 2020). Patients with bleeding dyscrasias, reactive airway disease, nasal bone fracturesor obstruction were excluded. Standard departmental protocol of awake intubation was followed. Informed and written consent was obtained from all patients with a complete explanation of the procedure.

Intraoperatively pulse oximetry, non-invasive blood pressure, electrocardiography and capnography monitors were used. Topical anaesthesia was administered in the form of nebulization with 4 milliliters (ml) of 4% injection (Inj) lidocainefor 10 minutes (mins). Inj midazolam 0.05 mg/kg intravenous (IV) was used as a sedative premedication along with Inj glycopyrrolate 0.2 mg IV as an anti-sialagogue,15 minutes prior to airway instrumentation, 0.05 percent xylometazoline nasal drops were instilled in both nostrils.Inj dexmedetomidine 1 g (microgram) /kg IV over 10-15 mins was started and supplemented by Inj fentanyl bolus of 1 g/kg, without the trauma of nerve blocks. Nasal intubation was done through the more patent nostril. 3 minutes prior to intubation 100% oxygen at 15 L/min was administered via the other nostril using a nasopharyngeal cannula and continued throughout intubation. Awake Ambu aScope3® guided nasotracheal intubation was done under the combination of topical airway anaesthesia with IV sedation technique. (Figure 1) The Scope used was of regular size having 60 cm working length and 5.5 mm outer diameter with a portable monitor, Ambu® aViewTM. An endotracheal tube of size 6.5 mm or 7.0 mm was used for nasotracheal intubation of female and male patients respectively.

Consultants and senior registrars with prior experience in Ambu aScope3® intubation on both manikins and real patients performed all intubations in the supine position. The Ambu aScope3® cord was introduced through the nares and advanced into the nasopharynx till the vocal cords were seen. A lubricated premounted endotracheal tube, was then inserted into the trachea through the vocal cords. Adifferent anaesthesiologist intubated each patient. All patients were successfully intubated on the first attempt, with no problems such as haemorrhage, desaturation, or oesophageal intubation.All anaesthesiologists were requested to complete a questionnaire form and score their experience on a five point Likert scale [(5) strongly agree, (4) agree, (3) neutral, (2) disagree, and (1) stronglydisagree].Percentage of glottic opening (POGO) score was used for the quantification of laryngeal exposure.[1] In no instance did any of the anaesthesiologist abandon Ambu aScope3®use.The intraoperative course was uneventful. All of the patients were successfully extubated at the conclusion of the surgery.

FIGURE 1: AwakeNasotracheal intubation being done via Ambu a Scope3®. (Source- original)

Results:

Demographic parameters of the patients are comparable (Table 1).

TABLE 1: Patient demographic and airway assessment data(Source- original)

(IID- Inter-incisor distance, BMI- Body Mass Index, POGO- Percentage of Glottic Opening.

Case	Age (years)	BMI (kg/m²)	POGO Scale (%)	(IID) (mm)
1	52	28.2	100	20
2	49	25.3	100	18
3	63	29.1	33	21
4	59	27.3	100	24
5	57	25.6	100	18
6	65	29.3	100	20
7	59	30.2	100	22
8	61	24.8	33	23
9	52	28.4	100	19
10	49	27.2	100	21

Demographic parameters of the patients are comparable (Table 1). We attempted to assess the Ambu aScope3® on a five point Likert rating scale. The various parameters chosen were ease to advance the scope, working channel handling, suctioning capability, ergonomics, ease to record images, lightweight handle benefit and ease of railroading endotracheal tube over scope. Scoring was based on the feedback given by various anaesthesiologists performing the intubation (Figure2).For each parameter, Ambu aScope3® received an average rating of greater than four.

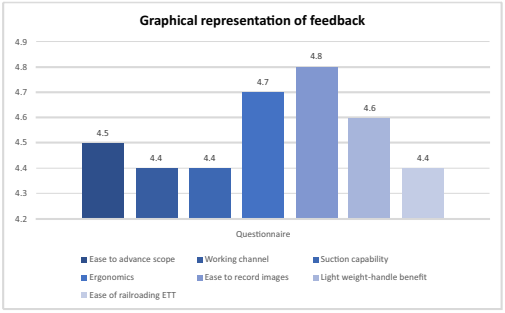

FIGURE 2: Graphical comparison of scoring given by different anaesthesiologists.(Source- original)

Discussion:

Lack of appropriate equipments for managing difficult airway in the operating room, emergency room, and intensive care unit (ICU) is one of the main factor contributing to adverse patient outcomes.[2]The Ambu aScope3® is a new single-use video-endoscope in the difficult airway armamentarium. For anaesthesiologists, the accessibility of this disposable flexible optical scope has numerous potential benefits: no time-consuming cleaning, no repair costs, avoidance of risk of cross-contamination, and above that access to a flexible scope, unlike the expensive reusable video laryngoscopes.[3]In three airway training manikins, Scutt et al compared the Ambu aScope to a traditional fibrescope for oral intubation, nasal intubation, and intubation via three supraglottic airway devices(SADs). They concluded that in simulated fibreoptic intubation the aScope performed well, with limited issues and failures, and that it could be a suitable training tool for both simulated fibreoptic intubation and conduit-assisted intubation (if adapted for untimed use). They recommended clinical studies to predict human performance as manikin-based

observations were not enough.[4]T. Piepho et al used ambuScope to compare the ease of tracheal intubation in manikins and patients. They found that using a single-use aScope video scope made tracheal intubation easier in both scenarios. They recommended that clinical patients with both unanticipatedand anticipated Difficult airway be evaluated further.[5]Two case reports on the usage of Ambu aScope were published by Mathews et al. Both were female, one with toxic multinodular goitre who needed tracheal intubation for subtotal thyroidectomy and the other had cancer of the breast scheduled formodified radical mastectomy. They came to the conclusion that the Ambu aScope is a simple, portable, and effective tracheal intubation device.[6]Omyma Shehata intubated50 adult patients with anticipated difficult intubation using Ambu aScope2. She observed that it had a high first pass

success rate in awake nasotracheal intubation in patients who hadanticipated difficult airway, and that using an assisted method reduced the time of video scopic intubation.3

In comparison to previous manikin based studies, our case series is based on patients having oro-facial malignancy with reduced mouth opening. Literature is scarce on the use of Ambu aScope3® on patients. To our knowledge,such extensive feedback from anaesthesiologists and POGO scoring has not been done before, using Ambu aScope3®. The average rating of Ambu aScope3® was more than four for each parameter by anaesthesiologists concluding that they were comfortable working with it. In eight cases, the percentage of glottic opening (POGO) score was 100 percent; however, two cases had a 33 percent POGO score, which could be due to oral cavity growth impeding scope negotiation.A major limitation of this case series was that no comparison was made between Ambu aScope3® and the gold standard fibreoptic bronchoscope. We recommend further studies comparing the use of Ambu aScope3® with fibreoptic bronchoscopy recruiting more patients in difficult airway scenarios.The Ambu aScope3® may be used as a possible alternative to fibreoptic bronchoscopy, however further randomized controlled trials should be done comparing the Ambu aScope3® with fibreoptic bronchoscope.

Conclusion:

Ambu a Scope 3®may be apractical alternative to the Gold standard fibreoptic bronchoscope.

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CELPHOS POISONING- A POISON THAT CAUSES RARE SURVIVAL

ARUN KUMAAR[1], MANPREET SINGH[2], RISHIKA GOEL[3]

ABSTRACT

Aluminum phosphide, commonly called celphos, is widely and easily accessible preservative used by farmers to preserve grains. It is one of the deadly poisons commonly encountered in developing countries. Poisoning as reported so far is commonly due to ingestion of salt or accidental inhalation. Literature search reveals the mortality rate this poison is low and approximates 30-100%. Here we report a case of 24 year old young male upon intentional intake of cephos who presented with non specific symptoms of vomiting and drowsiness. Even though so many trials across the globe have come up with various pharmacological modalities to support the management,a definitive antidote is not known to mankind yet. The objective of this report is to emphasize the importance of rapid diagnosis and to prompt initiation of supportive treatment in patients with celphos poisoning, which could be life saving.

KEY WORDS: Aluminium phosphide, celphos, magnesium sulphate.

INTRODUCTION

Mortality due to poisoning accounts to 0.3 billion/year globally.1With the overall mortality rate of celphos poisoning was reported from 30% to 100%[2], this poison came into light in 1980s at Indore where the poisoning was first reported. Since then, the incidence of this poisoning has been on a persistent upstroke.

Aluminium Phosphide(ALP) upon ingestion is known to liberate phosphine gas. Later, phosphne gas is absorbed from the gastro intestinal tract. The mechanism of cell injury leading to clinical symptoms is that phosphine gas in the mitochondria leads to non competitive inhibition of cytochrome oxidase of the electron transport chain.

Symptoms usually appear within few hours following exposure. These symptoms are usually non specific ranging from nausea, vomiting to cell death leading to organ damage like acute kidney injury, myocardial injury and injury to brain.

Celphos poisoning is a medical emergency demanding early and prompt management.

Despite the progress achieved in the fields of toxicology, celphos poisoning is still responsible for a high rate of mortality as there is no specific antidote .

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CASE

Presenting complaints (in Emergency. Dept.):

A24 year old male presented to GMCH emergency with alleged history of ingestion of three tablets of celphos that equates to approximately 9 grams with multiple episodes of vomiting which was non projectileand non bilious associated with diffuse pain abdomen. He was conscious, oriented to time, place and person.

Immediately , IV line was started, Ryle's Tube inserted. Gastric lavage was done.On examination, he was afebrile, pulse rate was122/min with a recorded BP of 100/64 mmHg and a respiratory rate of 28/min. He was maintaining an oxygen saturation of 88% on venturi mask @6lO2. His cardiorespiratory evaluation revealed no abnormalities. ECG showed sinus tachycardia with wide QRS complexes. His past history was insignificant.

Anaesthesia call was received and patient was evaluated and transferred to Intensive Care Unit on priority basis

Course in the intensive care unit:

Immediately on arrival to the ICU, he was given 100% oxygen, Inj. hydrocortisone 200mg I.V. stat, Inj. Magnesium sulphate 1g I.V. stat followed by 6g per day.Patient was given Non Invasive Ventilation(NIV) support to support his oxygenation.Bedside chest radiograph was ordered and was found to be normal.

On day two, patient was conscious but drowsy, with the pulse oximetry reading of around 72% on NIV and he was intubated and was put intermittent positive pressure ventilation mode with atidal volume of 500 ml, I:E ratio of1:2 and respiratory rate of12/min.

Serial blood gas analysispersistently revealed metabolic acidosis with a range ofPH-7.02, PCO2-32.6, PO2-122.3, Na-134, K-4.2 and HCO3 -4.1, Base Excess -27.5.Sodium bicarbonate correction was given as required.

Patient was started on Infusion noradrenaline @0.1 mcg/kg/min, Infusion Dopamine @ 6mcg/kg/min to attain hemodynamicstability. Simultaneously, supportive treatment in form of antibiotics, antacids was started.

His vitals, blood investigations and serial ECGs were duly monitored in ICU for the next 2 days.

Initially, the urine output was 400 ml/24 h with serum creatinine level of 7.1 mg/dl with urea of 366 mg/dl. The patient underwent two cycles of hemodialysis over next three days. Post dialysis creatinine levels came down to 3mg/dl and urine output improved 600 ml/24 h.

Gradual tapering of inotropic support was done, Inj. Magnesium sulphate was stopped and he was weaned off from mechanical ventilation by day 5.

DISCUSSION

Lethal dose of ALP is 1-1.5 g. Deaths are reported even with a dose of 150-500 mg.[3]

Toxicity of phosphine is related to oxidant free radicals and associated inhibition of enzymes of metabolism, such as cytochrome c oxidase. This causes focal myocardial necrosis and changes in action membrane potential as a result of the alteration in the permeability of sodium, magnesium and calcium ions. This is manifested in ECG as a spectrum of atrial fibrillation, supraventricular tachycardia, premature ventricular contractions and ST-T changes. Metabolic acidosis resulted, probably due to lactic acidosis, which was caused by the blocking of oxidation phosphorylation.[4]Circulatory collapse, arrhythmias, conduction defects and peripheral vascular leakage are the major cause of death initially.

Widespread capillary damage leads to bleeding diathesis, disseminated intravascular coagulation (DIC) and acute tubular necrosis. This explains acute renal failure in our case. Though literature says dialysis does not effectively remove phosphine, it is helpful when renal failure, severe metabolic acidosis or fluid overload is present.[5]

The rationale behind use of magnesium sulphate is that it acts as a cell membrane stabiliser and,

possibly, reduces the incidence of fatal arrhythmias. Also, it has an anti-peroxidant effect and it combats free radical stress due to phosphine.

To conclude ,Celphos poisoning has no antidote but early recognition of symptoms and supportive management is the key. Dialysis has a vital role in ALP induced Acute kidney injury.Early intubation and constant monitoring in intensive care can decrease morbidity and mortality.

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A COMPARATIVE STUDY OF MORPHINE AND CLONIDINE AS AN ADJUNCT TO ROPIVACAINE IN PARAVERTEBRAL BLOCK FOR MODIFIED RADICAL MASTECTOMY

Mukesh Kumar[1], Rajni Gupta[2], Ahsan K. Siddqui[3], Haeder Abbas[4]

Abstract:

Background: General anaesthesia is a standard for breast onco-surgery. The issue of postoperative pain and occurrence of nausea and vomiting has prompted the quest for a superior methodology with less complications. Over recent couple of years, paravertebral block (PVB) has acquired huge fame either in combination with GA or alone for anaesthetic management. In this study we aim to evaluate the efficacy ofmorphine and clonidine as an adjunct to ropivacaine in paravertebral block in breast cancer patients undergoing modified radical mastectomy.

Methods: In this study, total 90 patients were divided into three groups (30 each) on the basis of computer generated randomization. Group C (Control): Paravertebral block with 0.25% ropivacaine (19ml)and 1 ml saline; Group M- Paravertebral block with 0.25% ropivacaine(19ml) + 20 microgram/kg body weight morphine; Group N: Paravertebral block with 0.25% ropivacaine(19ml)+1.0 microgram/kg body weight clonidine.The post-operative pain intensity was recorded using the visual analog scale (VAS) and Sedation was observed by Ramsay Sedation score (RSS).

Results: The VAS was similar at 0hr, 2hr and at 4 hr in postoperative period among all the groups. There was significant (p=0.003) difference in VAS from 6 hr to 20 hr in postoperative period among the groups. A significant ($p<0.05$) difference was observed among the groups at 8 hr to 20 hr).The first requirement of analgesia was significantly (p=0.001) higher in Group N (7.70±1.74) than Group C (4.43±1.43) and Group M (7.33±2.21).

Conclusion: The morphine in paravertebral block are provides the better postoperative analgesia.The consumption of rescue analgesia was significantly reduced in morphine group as compared to clonidine group. The procedure also proved to be safe as no complication was encountered in the paravertebral block in our study.

Keywords:Ropivacaine, clonidine, morphine, paravertebral block, post-operative pain.

Introduction:

Pain is the most dreaded side effect of surgery for the patient during as well as after surgery. Pain has various physiological side effects such as increased myocardial oxygen, demand poor ventilatory function, high sympathetic tone, decreased urine output, paralytic ileus etc. as well as psychological disturbances like anxiety, sleep

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disturbances, altered behaviour and psychosis. Poorly controlled acute pain can lead to chronic pain syndrome which is very distressing to the patient therefore control of pain is an important element in perioperative period and requires exhausting effort from the attending anaesthesiologist.

Many treatment modalities have been developed against pain and its consequences. These modalities include intravenous analgesic (opioids and non-opioids), central neuraxial blockade, nerve plexus block, isolated nerve block and local infiltration. Some non-pharmacological method likes TENS, acupuncture, and acupressure etc. has been tried with variable success.

Concept of paravertiberal block was pioneered by Hugo Sellheim of Leipzig in 1905. It was further refine by Lawen (1971) and Kappis (1919) when a renewed intrest developed in the topic due to efforts from Eason and Wyatt who presented a reappraisal on Thoracic paravertebral block (TPVB). Thoracic paravertebral block (TPVB) provides high quality analgesia and great advantage for the patients undergoing many different surgeries. At the same time, relieves the acute post-operative pain and may prevent development of chronic pain. The traditional pain management had been reported to cause inadequate pain control.The possible complication can be inadvertent vascular puncture, pleural puncture, pneumothorax, epidural or intrathecal spread, failure of the technique andhypotension. To reduce the complications, many modalities have been introduced, for example, ultrasound-guided technique, nerve stimulator technique, and under fluoroscopic guidance.

Several adjuvants such as epinephrine, clonidine,fentanyl, morphine, and dexmedetomidine have been used with local anesthetics (e.g., ropivacaine, bupivacaine, and lignocaine) for improving and prolonging the postoperative analgesia with encouraging results.

Morphine is principal alkaloid of opium. Morphine acts as a mu agonist, binding to receptors in the brain, spinal cord and other tissues. Local anaesthetic drug with adjuvants like fentanyl, morphine and clonidine have been study and they improve the quality of the blockade.

Ropivacaine is a local anesthetic block the generation and the conduction of nerve impulses, presumably by increasing the postjunctionally in medulla (vasomotor centre) threshold for electrical excitation in the nerve, by slowing the propagation of the nerve impulse, and by reducing the rate of rise of the action potential. In general, the progression of anesthesia is related to the diameter, myelination and conduction velocity of affected nerve fibers. Specifically, the drug binds to the intracellular portion of sodium channels and blocks sodium influx into nerve cells, which prevents depolarization.

Imidazoline derivative, partial agonist with high affinity and high intrinsic activity 1at alpha -2 receptors (alpha-2A subtype) in brainstem. Major hemodynamic effects result from stimulation of alpha-2A receptors present mainly postjunctionally in medulla (vasomotor centre). In this study we aim to evaluate the efficacy and usefulness of paravertebral block in breast cancer patients undergoing modified radical mastectomy.

Materials and methods:

After getting approval from Ethical committee this case control prospective randomized single blind study carried out. Written informed consent was obtained from each patient. In this study, total 90 patients were enrolled on the basis of well-defined inclusion and exclusion criteria. Diagnosed cases of carcinoma breast with ASA I and ASA II physical status, age between 18-60 years and scheduled for elective modified radical mastectomy patients were included in this study. Patient history with contraindications of paravertebral block, heart block, Psychiatric illness, bleeding disorder, allergy to amide type local anaesthetics, infection at the thoracic paravertebral injection site, body mass index > 35kg/ m, previous ipsilateral thoracic surgery, total pleurectomy, localized tumor,

empyema and abnormal thoracic anatomy were excluded from the study.

All 90 patients were divided into following three groups (30 each) on the basis of computer generated random table. Group C (Control): Paravertebral block with 0.25% ropivacaine (19ml) + 1 ml saline; Group M- Paravertebral block with 0.25% ropivacaine(19ml) + 20 microgram/kg body weight morphine; Group N: Paravertebral block with 0.25% ropivacaine(19ml) + 1.0 microgram/kg body weight clonidine.

All patients were given premedication on the night before surgery with ranitidine 150 mg, and alprazolam 0.25 mg orally. All of them were properly informed regarding the procedure of giving paravertebral block and were preloaded with 10-15 ml/kg of Ringer Lactate. After the patients had been given paravertebral block, the following clinical parameters were monitored - Intraoperative and postoperative heart rate, mean arterial pressure, SPO and complications were recorded.

In the operating room (OR), intravenous access was secured and IV fluid was started. Standard monitoring with electrocardiogram (ECG), non-invasive oscillometric blood pressure (NIBP) and pulse oximeter (SpO) was initiated.

All patients were positioned in sitting position and C7 cervical spine identified and marked T4 – T7 vertebra respectively. Under aseptic precautions, at 2.5 cm lateral to the cephalad edge of the T4 spinous process, the skin, subcutaneous tissue and the periosteum of the transverse process of the T4 vertebra was infiltrated with 3 ml of Lignocaine 2%. A 25G 10 cm insulated needle was introduced at 90 degree to the skin, at the site of local anaesthetic infiltration. The needle was advanced till it touches the transverse process of the vertebra, noting the depth. The needle was withdrawn and then advanced slightly caudal to walk off the transverse process for a distance of 1.0 to 1.5 cm. The study drug (20 ml), as per the group allocation, was injected in small aliquots of 5 ml with repeated aspiration in between. Any complication or difficulty during the performance of PVB will also be noted.

Thereafter, general anaesthesia was premedicate with ondansetron 4mg and glycopyrrolate 0.2mg, then induced the patients with intravenous fentanyl 2 µg/kg and propofol 2 mg/kg. Orotracheal intubation was facilitated by Sch 2mg/kg and ventilation was controlled. Anaesthesia was maintained with vecuoronium, oxygen and nitrous oxide, and inhalational agents. Mean arterial pressure (MAP) was maintained within 20% of the preoperative baseline. IV emset 4mg was administered once the patient is induced. No other analgesics were administered intra-operatively. IV mepheteramine 6 mg was administered as needed to keep MAP more than 60 mmHg, bradycardia manage by injection atropine 0.02mg/kg BW. At the end of surgery, residual neuromuscular blockade was reversed with 50 µg/kg neostigmine + 10 µg/kg glycopyrrolate and patient was extubated on spontaneous respiration and return of consciousness. In postoperative period we assess duration of analgesia, VAS, RSS, time of first requirement of rescue analgesia, total consumption of rescue analgesia and any complication in postoperative period.

In the postoperative anaesthesia care unit (PACU), the patients were monitored for two hours. Analgesia, level of sedation and PONV was assessed on arrival to PACU, at 0hr, and at 2 hr interval upto24 hours, VAS score where 0=no pain and 10=worst imaginable pain. If the patient complains of pain and VAS >3, IV paracetamol 100 ml infiusion was administered and maintain VAS ≤ 3 during the PACU stay. The patients were receive IV paracetamol 100 ml infusionas rescue analgesia in the ward from the time they complain of pain (VAS > 3). The duration of analgesia in minutes counted from the time of initiation of the PVB to the first analgesic request (VAS > 3) was noted.

Nausea was defined as a subjectively unpleasant sensation associated with awareness of the urge to vomit. An event of vomiting was defined as vomiting (forceful expulsion of gastric contents from the

mouth) or retching labored, spasmodic, rhythmic contractions of the respiratory muscles without expulsion of gastric contents. PONV was assessed on a 3-point numerical rating scale where 0=no nausea, no vomiting; 1= nausea present, no vomiting; 2=vomiting present with or without nausea. IV ondansetron 4 mg was administered as rescue antiemetic if the PONV score is 2 or more.

Statistical analysis:

Continuous data were summarized as Mean ± SD while discrete (categorical) in %. The outcome measures (pulse rate, systolic BP, diastolic BP, SpO2, sedation score and VAS score) of three groups over the periods (time) were compared by repeated measures two factor (Groups x Periods) analysis of variance (ANOVA) using general linear models (GLM) followed by Tukey's post hoc test after ascertaining the normality by Shapiro-Wilk test and the homogeneity of variance by Levene's test. Groups were also compared by one way ANOVA followed by Tukey's post hoc test. The categorical variables were compared by chi-square ($\chi 2$) test. A two-sided ($\alpha=2$) $p<0.05$ was considered statistically significant. All analyses were performed on STATISTICA (window version 6).

Results:

The baseline characteristics of the patients are shown in Table 1. The mean age (years), Height (cm), Weight (kg) and BMI (kg/m2) were 44.20±9.37, 157.17±7.14, 62.53±6.17 and 25.43±3.15 in group C; 49.17±7.87, 153.3±5.88, 608±5.3and 25.62±2.87 in group M and 47.50±8.95, 156.83±8.1, 61.3±4.58 and 25.12±3.38 in group N, respectively. The mean age (years), Height (cm), Weight (kg) and BMI (kg/m2) and distribution of patients according to ASA were not significantly different in between groups.

	Group C (n=30)		Group M (n=30)		Group N (n=30)		p-value[1]
	Mean	-	Mean	±SD	Mean	±SD	
Age (years)	44.20	9.37	49.17	7.87	47.50	8.95	0.15
Height (cm)	157.17	7.14	153.3	5.88	156.83	8.1	0.15
Weight (kg)	62.53	6.17	60	5.38	61.3	4.58	0.21
BMI (kg/m2)	25.43	3.15	25.62	2.87	25.12	3.38	0.91
ASA	No.	%	No.	%	No.	%	
I	16	53.3	17	56.7	13	43.3	0.23
II	14	46.7	13	43.3	17	56.7	

Table 1: Baseline characteristics of patients

The heart rate was similar at 0 min among all the groups ($p>0.05$). The heart rate was almost stable in the intraoperative period and post-operative period. No significant ($p>0.05$) difference was observed among the groups in heart rate at different time intervals (Fig 1).

The MAP was similar at 0 min among all the groups ($p>0.05$). The MAP was almost stable in the intraoperative period and post-operative period. No significant ($p>0.05$) difference was observed among the groups in MAP at different time intervals (Fig. 2).

The SPO2 was similar at 0 min among all the groups ($p>0.05$). The SPO2 remained 97 – 100% in the intraoperative period and post-operative period among all the groups. No significant ($p>0.05$) difference was observed among the groups in SPO2 at different time intervals (Fig. 3).

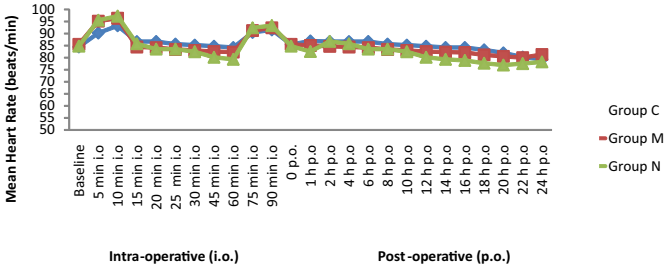

Fig. 1: Mean heart rate in intra- and post-operative

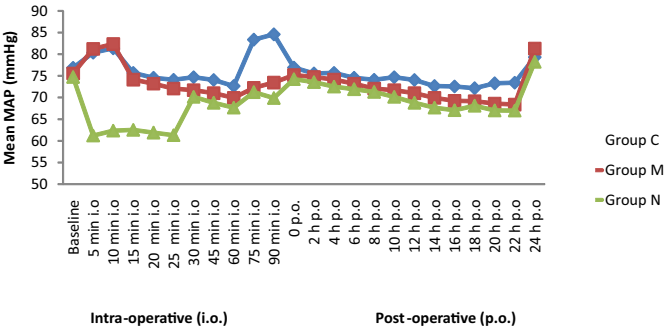

Fig. 2: Mean MAP rate in intra- and post-operative

The VAS was similar at 0hr, 2hr and at 4 hr in postoperative period among all the groups. There

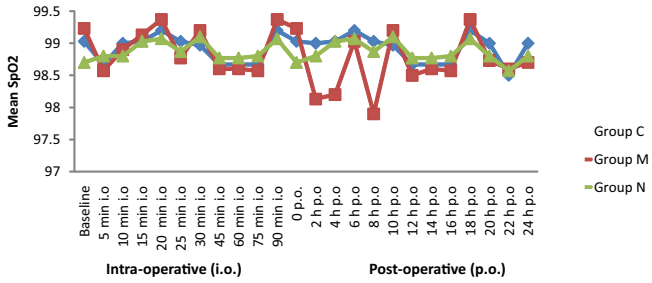

Fig. 32: Mean SpO2 in intra- and post-operative

was significant (p=0.003) difference in VAS from 6 hr to 20 hr in postoperative period among the groups. A significant (p<0.05) difference was observed among the groups at 8 hr to 20 hr (Table 2).

Table 2: Comparison of VAS score among the groups

Time period	Group C (n=30)		Group M (n=30)		Group N (n=30)		p-value[1]
	Mean	SD	Mean	SD	Mean	SD	
0 hr	1.00	0.00	1.00	0.00	1.00	0.00	NA
2 hr	1.00	0.00	1.00	0.00	1.00	0.00	NA
4 hr	1.00	0.00	1.00	0.00	1.00	0.00	NA
6 hr	4.27	0.45	1.00	0.45	1.00	0.37	0.003*
8 hr	4.43	0.63	2.43	2.43	1.00	1.23	0.002*
10 hr	1.99	1.49	3.70	3.79	1.00	1.02	<0.001*
12 hr	1.29	0.53	4.27	0.99	0.99	0.72	0.003*
14 hr	4.45	0.53	1.43	1.99	4.30	0.54	0.001*
16 hr	4.53	0.73	1.00	1.94	4.33	0.71	0.001*
18 hr	1.00	0.68	4.40	3.99	1.63	0.93	<0.001*
20 hr	1.00	0.21	1.43	1.01	2.80	0.41	0.02*
22 hr	1.00	0.33	1.33	1.89	1.80	1.06	0.08
24 hr	1.00	0.54	1.00	1.01	1.00	0.79	0.77

1ANOVA test, *Significant, NA-Not applicable being SD 0.00

The RSS was similar at all the time intervals among all the groups in postoperative period (Table 3).

Table 3: Comparison of Ramsay Sedation score (RSS) among the groups

Time period	Group C (n=30)		Group M (n=30)		Group N (n=30)		p-value[1]
	Mean	SD	Mean	SD	Mean	SD	
0 hr	1.00	0.82	1.77	0.81	1.93	0.45	0.09
2 hr	1.00	0.58	1.67	0.35	3.53	0.73	0.02*
4 hr	1.00	1.03	1.53	0.45	2.30	0.60	NA
6 hr	1.00	0.83	1.47	0.68	1.97	0.85	0.11
8 hr	1.00	0.96	1.30	0.59	1.87	1.14	0.10
10 hr	1.00	0.62	1.00	0.26	1.80	1.30	0.12
12 hr	1.00	0.46	1.00	0.35	1.10	1.03	0.14
14 hr	1.00	0.00	1.00	0.37	1.03	0.97	NA
16 hr	1.00	0.00	1.00	0.64	1.00	1.17	NA
18 hr	1.00	0.00	1.00	0.37	1.80	1.10	NA
20 hr	1.00	0.00	1.00	0.37	1.10	0.45	NA
22 hr	1.00	0.48	1.00	0.25	1.00	0.43	0.12
24 hr	1.00	0.48	1.00	0.18	1.00	0.45	0.13

1ANOVA test, *Significant, NA: Not application

A significant difference was found in the first requirement of rescue analgesia in postoperative period among the groups (p<0.001). The first requirement of analgesia was significantly (p=0.001) higher in Group N (7.70±1.74) than Group C (4.43±1.43) and Group M (7.33±2.21) (Table 4).

A significant difference was found in 24 hour requirement of rescue analgesia in postoperative period among the groups (p=0.001). The 24 hour consumption of rescue analgesia in postoperative period was significantly (p=0.001) lower in Group N (1.43±0.50) than Group C (2.07±0.64) and Group M (1.63±0.55) (Table 4).

Total consumption of antiemetic was among 16.3% of the patients in Group M only (Table 4).

Table 4: Comparisons of mean Time of first requirement of rescue analgesia and mean 24 hour consumption of rescue analgesia (paracetamol) in groups

	Group C (n=30)		Group M (n=30)		Group N (n=30)		p-value[1]
	Mean	SD	Mean	SD	Mean	SD	
Time of first requirement of rescue analgesia	4.43	1.43	7.33	2.21	7.70	1.74	<0.001*
24 hour consumption of rescue analgesia (paracetamol)	2.07	0.64	1.63	0.55	1.43	0.50	0.001*
	n	%	n	%	n	%	
Consumption of antiemetic (ondansatron)	0	0.0	4	16.3%	0	0.0	0.015*

ANOVA test, *Significant, a,b,cp=0.001 (Post hoc comparison test)

Table 5 shows the presents the comparison of side effects among the groups. Hypotension was found among 6.6% in Group N only and respiratory depression in 6.6% of Group M patients. Itching was in 3.3% of Group M and Group N.

Table 5: Comparison of complications among the groups

	Group C (n=30)		Group M (n=30)		Group N (n=30)		p-value[1]
	n	%	n	%	n	%	
Hypotension	0	0.0	0	0.0	2	6.6	0.129
Respiratory depression	0	0.0	2	6.6	0	0.0	0.129
Urinary retension	0	0.0	1	3.3	0	0.0	0.364
Itching	0	0.0	1	3.3	1	3.3	0.600
Shivering	0	0.0	0	0.0	0	0.0	-
Others	1	3.3	0	0.0	0	0.0	0.364

1Chi-square test, NA: Not application

Discussion

Different types of surgical treatment are available for patients with breast cancer. Standard surgical procedures include- lumpectomy, segmental mastectomy, total mastectomy, modified radical mastectomy & radical mastectomy. General anaesthesia (GA) is currently the standard technique used for surgical treatment of breast cancer. However, the side-effects and complications of general anaesthesia preclude ambulatory surgery for most patients undergoing breast surgery. Nausea and vomiting after breast cancer surgery with general anaesthesia prolongs recovery room stays and necessitates hospitalization for patients otherwise able to undergo ambulatory surgery.15 Parenteral narcotic use is routine after emergence from anaesthesia and during the early postoperative interval, which further increases the incidence of nausea, vomiting, sedation and results in prolonged recovery room and hospital stay.

Regional anaesthesia using paravertebral block (PVB) is an ideal alternative to general anaesthesia for breast cancer surgery. The mechanism of action of paravertebral analgesia is by direct penetration of local anaesthetic into the intercostal nerve, including its dorsal ramus, the rami communicates and the sympathetic chain. Benefits of paravertebral block include a reduction in postoperative nausea and vomiting, prolonged postoperative pain relief and potential for early discharge.

In the present study we observed that all the three groups were comparable and there was no statistically significant difference (p>0.001) between the groups with respect to demographic characteristics of age, weight, height, body mass index and ASA grading.

In present study the heart rate was similar at 0 min among the entire group (p>0.05). The heart rate and Mean arterial pressure was almost stable with the time intervals. No significant (p>0.05) difference was observed amongs the groups in heart rate at different time interval, but hypotension occur in 2 cases of clonidine which was insignificant.

We assess VAS score in postoperative period in all patients and observed that VAS is similar at 0 hrs, 2 hrs, and at 4 hrs in postoperative period among all the groups. However, a significant (p<0.05) difference was observed among the groups from 6 hr to 20 hr. Group M had lesser VAS scores than Groups C and N, and the least VAS score in Group M. This finding is in consonance with the other studies done so far in this field. Similarly, Klein et al. (2000) also observed that patients receiving PVB experienced statistically significant less pain in comparison to patients receiving GA only . Terheggen et al. (2002) observed that VAS scores in the postoperative period were significantly lower in the patients who received PVB.18 The maximum VAS score in the PVB group was 11±15 mm versus 44±23 mm in the GA group (p<0.001). The PVB prior to GA, results in lesser VAS scores in comparison to control group.19The preoperative PVB seems to reduce the prevalence of chronic pain even after 1 year of breast cancer surgery.The patients received PVB has significantly lower VAS than group not receiving PVB.19 Sinha et al. (2012), in their study on 60 patient observed that group II(0.25% 18ml ropivacaine with dexmedetomidine) had significantly prolongs the duration of analgesia in PVB, and VAS were comparable in the immediate postoperative period but after that it became

significantly higher VAS in Group I across .

VAS score was used as the parameter for determining the requirement of rescue analgesia in postoperative period. Patients reporting with VAS scores of three or more were provided rescue analgesia with paracetamol intravenously. All the groups were compared for doses of paracetamol consumption. Group M was found to have a significantly lower consumption of paracetamol in grams (mean 1.43 + 0.50) during the postoperative period than other Groups, the least requirement of rescue analgesia in Group M. In the study by Coveney etal. 1998), only 14 out of 112patients receiving PVB (12.5%) required postoperative analgesia as compared to72 out of the 89(80.9%) patients who received general anaesthesia($p<0.0001$).

In the present study significant difference was found in the time of first requirement of rescue analgesia in postoperative period among the groups ($p=0.001$). The time of first requirement of rescue analgesia in postoperative period was significantly ($p=0.001$) higher in group N (7.70 +1.74) than Group M (7.33 + 2.21).The fentanyl and clonidine in combination with low dose ropivacaine has superior analgesic efficacy to plain ropivacaine.

In present study significant difference was found in the sedation amongs the groups. The sedation score is higher in group C. Similarly, Huang et al (2014) observed that clonidine associate with a significant increase of postoperative sedation within 24 hours.

Nausea and vomiting was observed in 20% and 50% of all operative procedures respectively and more so in female patients undergoing general anaesthesia. The NRS scores of all groups were compared. Observations were recorded at every 2 hr interval upto 24 hr postoperatively. Similarly, another study involving 25 patients and observed that out of the seventeen patients receiving PVB, 13 patients had no nausea or vomiting in the entire postoperative period.

The patients receiving PVB had comparatively lesser incidence of PONV in comparison to the patient of GA group.22The PONV in the PVB group was significantly less ($p=0.026$) in comparison to the placebo group.19The PONV in the PVB group at 24 hrs postoperatively was significantly less ($p=0.04$) in comparison to patients receiving GA only. Moller et al.(2007) observed that out of the 38 patients in the PVB group only 7 patients complained of PONV.20 Similarly, Kanchan et al. (2013) observed that no statistical significant in PONV with multilevel PVB with bupivacaine 0.5% and ropivacaine.

Various studies on paravertebral blocks have quoted different rates of complications. No complications were reported. 25 Coveney et al (1998) has reported complication in 2.6% of patient with two cases experiencing epidural extension while one patient developed pneumothorax. Terheggen et al. (2002) reported one case with epidural block and one patient with pleural puncture.18 Kanchan et al (2013) reported that none of patient had any complication in the first 24 hr in postoperative period.

In the present study, no complications related to the procedure technique were noted inall theGroups. There was no evidence of pneumothorax, hematoma, total spinal anaesthesia, local anaesthetic toxicity. Hence paravertebral block can be considered as a safe adjunct to general anaesthesia.

In present study Group N had best patient satisfaction and early recovery than Group M, and C. our study similar to these studies, the use of preoperative PVB in patient undergoing mastectomy plus immediate reconstruction significantly decreased patient length of stay.27Both bupivacaine 0.5% and ropivacaine 0.5% provide good patient satisfaction score after a multilevel thoracic PVB.

Conclusion

We conclude that morphine as an adjunct to ropivacaine in paravertebral block provides better postoperative analgesia. Morphine provides superior analgesia in the postoperative period than clonidine as an adjunct to ropivacaine in paravertebral block. The rescue analgesia consumption was significantly reduced in morphine group as compared to clonidine group. The onset of pain was significantly delayed in clonidine groupas compared tomorphine group. The ropivacaine provide better haemodynamic stability than morphine and clonidine. Morphine causes more postoperative nausea and vomiting. The procedure also proved to be safe as no complication was encountered in the paravertebral block in our study.

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Exploring the feasibility of Medicam paediatric videolaryngoscope for intubation in infants with hydrocephalous: A prospective observational study

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Abstract:

Background: Anaesthetic management of infants with hydrocephalus poses several challenges, of which airway control tops the priority list. The purpose of the current study is to explore the feasibility of Medicam paediatric videolaryngoscopes (MPVL) in infants with hydrocephalous. Methods: We performed an observational study with the recently introduced MPVL in such 22 infants who had undergone elective general anaesthesia for shunt placement. Time to best visualization of glottis (TTBV) and Time to intubate (TTI), ease of intubation, number of attempts, POGO scoring and complications were recorded. Results: The median intubation time from insertion of the VL between two incisors to best visualization of the glottis on the screen and from insertion of the VL between two incisors to the first reading on the capnography were 9 and 29 sec respectively. The ease of intubation was grade 1 in 15 out of the 22 patients.17 out of 22 patients were intubated in a single attempt and a POGO score of grade 3 (100%) was found in 18/22 cases. Despite being enlisted as anticipated difficult airway; all patients were intubated successfully and most of them were intubated in the first attempt within an acceptable time limit. Conclusions: The current study emphasises the utility of MPVL in paediatric population when a difficult airway is anticipated, such as in infants with hydrocephalus.

Keywords:Airway management; Intubation; Laryngoscopy.

Introduction:

Airway management in paediatric patients is always a challenging task. This problem is further compounded in infants with specific head and neck related pathology as in cases of hydrocephalous. Presence of enlarged head, difficulty in positioning for intubation, and presence of other associated congenital anomalies are major issues that concern the anaesthesiologist during management of such infants.[1] Inaddition, the associated physiological characteristics of infants such as high oxygen consumption, low functional residual

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capacity and a small lung capacity together shorten the apnoea time leading to early desaturation.[2] An enlarged occiput drives the neck into excessive flexion and a wide forehead can impede the view of the laryngoscope, hence it's important to elevate the torso using a folded sheet or pillow to make intubation easier. It can be difficult to position a small child optimally for glottis viewing, and the alignment of the anatomic axes will vary depending on the patient's age and size. Intubation failure after multiple attempts especially in paediatric difficult airway often leads to significant morbidity and mortality.[3]Video laryngoscopes (VL) are drawing a lot of attention as a novel airway device for both routine and challenging paediatric airway situations. VL has a substantial and growing impact on airway control and are considered a great option for intubation because they've been shown to improve glottic view and first-attempt success rates, which is especially important in paediatric difficult airway situations.[4,5,6,] Medicam paediatric videolaryngoscope (MPVL) is a recently introduced device in the armamentarium of paediatric airway management. We conducted an observational pilot study to assess the efficacy of the MPVL for intubation in subset of difficult paediatric airway as in infants with hydrocephalous.

Methods:

Ethical clearance- Ethics committee (Institutional review) board of our hospital had approved this study. Parents gave written informed consent as per the institutional board of our hospital.

The present study was conducted between January 2019 and January 2020, with total recruitment of 22 infants with hydrocephalous (Figure 1) who met the eligibility criteria undergoing elective general anesthesia for shunt placement.Patients undergoing emergency surgery, as well as those with major cardiac anomalies, reactive airway disease, and metabolic disorders, were excluded from the study. Airway assessment was done by Colorado Pediatric Airway Score (*COPUR* score). On a four-point scale, this scale rates chin size, interdental opening, previous intubation or OSA, uvula visualisation, and estimated neck range of motion. Scores of more than ten indicate difficult intubation and thus excluded from the study.

At the time of the preanesthetic checkup, the child's guardian signed an informed written consent form. The likelihood of other congenital and genetic defects, neurologic impairments, and any indicators of elevated intracranial pressure were also considered during the preoperative evaluation. Along with the CT scan, routine laboratory findings were acquired. There were no assosciated congenital abnormalities in any of the infants included in the study.

For each patient, a standardised anaesthetic protocol was followed as per institutional practice. Because a minimum of 50 orotracheal intubation procedures under supervision are required for proper intubation training, MPVL intubation training was achieved by an experienced and skilled anesthesiologist (>50 uses).[7] As per standard guidelines, all infants were kept nil-per-mouth. In the operation theatre, they were given atropine 0.02 mg/kg IV, dexamethasone 0.5 mg/kg IV, and fentanyl 2 microg/kg IV, and standard monitoring was established, including pulse oximetry, electrocardiogram (ECG), noninvasive blood pressure recording, and temperature monitoring. The infants were positioned with a shoulder roll, the

head (occiput) on a thin head ring and the body rested on the stack keeping in mind the 3 visual markers to align the glabella horizontally with the chin, the external auditory meatus (EAM) with the suprasternal notch (SN), and the neck wide open.

Following preoxygenation with 100% oxygen, inhalational anesthetic induction was achieved by 8 percent sevoflurane in incremental doses in 50 percent nitrous oxide (N2O) and 50 percent oxygen through a face mask. A sufficient depth of anaesthesia for intubation was determined by centralization of pupils and the absence of a hemodynamic response to a jaw thrust. Prior to intubation, none of the infants were given muscle relaxants. The infant Medicam miller laryngoscope blade (size 0 or 1) was introduced midline into the oral cavity across the tongue base and tip of the blade was put in the vallecula. The trachea was intubated using an age-appropriate uncuffed endotracheal tube with stylet after acquiring a good view of the glottis on the attached screen. Capnography and chest auscultation were used to validate the correct placement of the endotracheal tube. Maintenance of anaesthesia was done with 1 to 2 percent sevoflurane and 60 percent N2O in O2 were used.

Following parameters were recorded: Intubation time which was divided into Time to best visualization (TTBV) of glottis and Time to intubate (TTI). TTBV is the time from insertion of the VL between two incisors to the best visualisation of the glottis on screen and TTI is the time from insertion of the VL between two incisors to the first reading recorded on the capnography; Ease of intubation is graded as Grade 1 that indicates that no external laryngeal manipulation is necessary, Grade 2 indicates that either head position, external laryngeal manipulation, or jaw thrust is required, and Grade 3 indicates that intubation has failed. We also recorded number of attempts and POGO scoring. An attempt is defined as removing the intubating device from the mouth, regardless of the outcome. POGO score ranging from 0% to 100% assigned to the visual estimation of the laryngeal opening (A glottic opening percentile score of 100% indicates full visualisation of the larynx from the anterior commissure to the posterior cartilage, while a score of 0% indicates no glottic opening at all).[8] Desaturation, bradycardia, and trauma during intubation (the presence or absence of blood on the blade after it was removed from the oral cavity) were all identified as complications.

A member of the anaesthetic team used a stopwatch to keep track of the time. Manual breathing with 100% oxygen was resumed if SpO2 fell below 94% at any stage during the procedure. It was regarded a failure if intubation was unsuccessful after two attempts. Subsequent intubation was accomplished with Miller laryngoscope.We applied IBM SPSS version 20 to analyze data. The data for the outcome measures is presented using binominal confidence intervals.

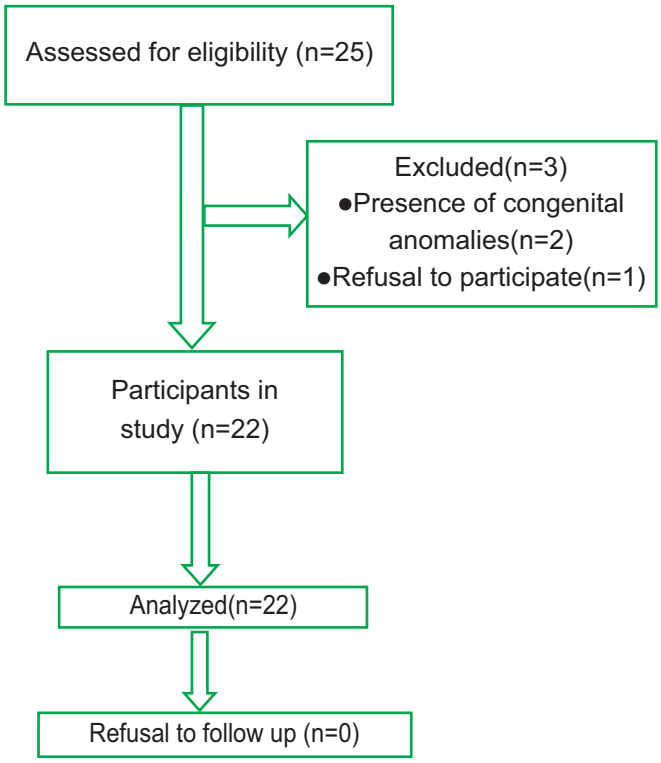
Results:

In the present study, 25 infants were assessed for the eligibility over a period of one year. Three patients were excluded out which two had associated congenital anomalies and parent of one patient refused to participate in the study. A total of 22 patients underwent tracheal intubation with the MPVL (as shown in figure 1). Demographic characteristics of patients are shown in Table 1.

TABLES 1: Demographic data of the patients

Age (months)	7.28±1.42
Sex (Male: Female)	
Weight (kg)	6.88±1.16
Head circumference (cm)	58.66±8.78

Figure 1: Consort diagram



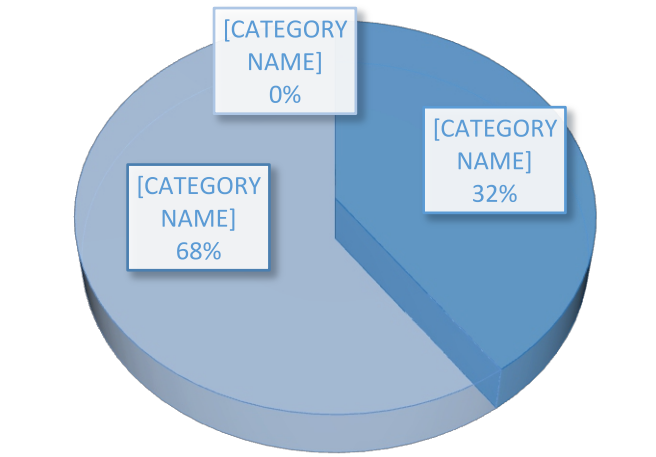
The median (IQR [range]) times from insertion of the VL between two incisors to best visualization of the glottis on the screen and from insertion of the VL between two incisors to the first reading on the capnography were 9 (7-12, Q1-7.25, Q3-10) sec and 29 (25-37, Q1-27, Q3-31.75) sec, respectively (as shown in

Table 2).

TABLES 2: Intubation times

	Mean±SD	Median; Q1; Q3
TTBV	8.86±1.55	9; 7.25; 10
TTI	29.23±3.51	29; 27,31.75

Figure 2: Ease of intubation

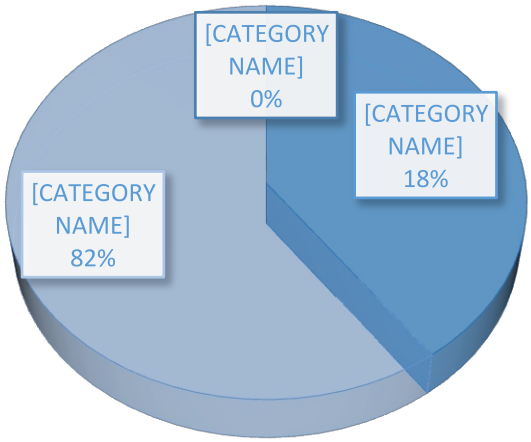


The ease of intubation was grade 1 in 15 out of the 22 patients (68%, CI 47-83%). Seven patients had grade 2 (32%, CI 16-53%), and none of the patients had grade 3 (as shown in figure 2). The results showed that 17 out of 22 patients (77%, CI 56-90%) were intubated in a single attempt, while 5 patients required two attempts (23%, CI 9-44%). In 18/22 cases, a POGO score of grade 3 (100%) was found (82% CI 61-93%). POGO score of grade 2 (50-100%) was present in 4/22 patients (18%, CI 7-39%), while no patient had a POGO score of grade 1. (as shown in Table 3, figure 3). Traces of blood on device was found only in a single patient (4%, CI <0.0001-23%). There were no complications recorded in any of the patients, such as bradycardia or desaturation.

Table 3: Ease of intubation, Intubation attempt and POGO score

	n=22
Ease of intubation: Grade 1	15(68)
Grade 2	7(32)
Grade 3	0(0)
Intubation attempt: 1	17(77)
2	5(23)
POGO score: Grade 1: <50%	0(0)
Grade 2: 50-100%	4(18)
Grade 3: 100%	18(81)

Figure 3: POGO score



Discussion:

The present observational study suggests the potential role of MPVL for intubation in infants with hydrocephalous. In the ever-expanding armamentarium of airway management, MPVL is the most recent addition. It is like conventional macintosh/miller blade with added advantage of video system with inbuilt LED illumination, video recording/ image storing, 180° rotating LCD screen, and magnification. It comes with a variety of paediatric blades (miller 0,1,2 and macintosh 1,2).

A search into literature suggests substantial evidence in favor of VL in paeditric difficult airway.[9,10,11]. However, there are only few case reports available which highlights the airway management in infants with hydrocephalous.[1] Therefore, we conducted an observational study to determine the effectiveness of MPVL in this subset of population. In the present study, the time to best visualization of glottis was 8.86±1.55 sec and median intubation time was 29.23±3.51 sec. Although glottis visualization was early, guiding the ETT through the vocal cord took a considerably longer time. Possible explanation for this finding could be narrow angle of view, presence of oral secretions, indirect view on screen. All these factors may contribute to prolongation of TTI even with a good view of the glottis. Consistent with the use of other VL, MPVL required good eye hand coordination and practice as there is no direct line of vision and tube is advanced into glottic opening by viewing the image projected on screen. Although the intubation time was prolonged, it was clinically acceptable as none of the patients had an episode of desaturation.

We did not find any study exclusively on airway management of infants with hydrocephalous to compare our findings with. However, Vlatten et al in a prospective, randomized study of 56 children (ages 4 years or younger) with simulated difficult airway with cervical inline immobilization reported an intubation time of 27 sec with VL and 21 sec with DL with Macintosh/miller blade.[12]Similar intubation time (27.90±10.90sec

with CMAC and 24.80±7.9 sec with Mac blade) has been reported by Sinha et al in their randomized crossover study of forty children of 4-14 years of age wherein C-mac VL was compared with DL in children with simulated cervical spine injury.[13]

Number of attempts at intubation is an important consideration in paediatric patients as increasing intubation attempts is proportional to airway related complications especially in infants.

Intubation was successful in 77% (CI 56-90%) of our patients on the first attempt, whereas 23% required two intubation attempts. VL has been proven to increase glottic vision and first-attempt success rates, particularly in difficult airway situations.[4,5,14] Aziz et al.performed a comparison of the C-MAC Video Laryngoscope to Direct Laryngoscopy in the scenario of a predicted difficult airway in a randomised controlled trial.[15] In comparison to direct laryngoscopy (124/147; 84%), they observed that video laryngoscopy resulted in more successful intubations on the first attempt (138/149; 93%). In a bicentric randomized controlled trial in children less than 1 year with simulated difficult airway situation, Kriege et al. revealed that the hyperangulated blades of the King Vision and C-MAC video laryngoscopes enabled 92 and 100% first-pass intubation success rates, respectively, compared to 65 and 76% for conventional laryngoscopy using the Miller Blade and Macintosh Blade.[16]

In 68% of the patients, we observed that the ease of intubation was grade 1. Patients in grades 2 accounted for 32% and none had grade 3 respectively. MPVL produces images on screen with high magnification and brightness making intubation easier for the clinician. The results of our study gain strength form the findings of other studies (Karsli et al.[17]& Maniranjan et al.[18]) wherein better grades for ease of intubation has been demonstrated with the use of videolaryngoscope.

In our study, majority of the infants (18/22 cases) had higher POGO score of 100% (82%, CI 61-93%). POGO score of grade 2 (50-100%) was present in 4/22 patients (18%, CI 7-39%). Similarly, improved POGO score has been demonstrated in other studies involving VL. Cakirca et al, compared McGrath and TruView EVO2 with Macintosh laryngoscope in 90 paediatric cases aged 4-10 years who were to undergo endotracheal intubation for surgery. The Macintosh laryngoscope group had a lower POGO score than the other two groups.[19] Singh et al. found that while intubating paediatric patients scheduled for elective surgery with three equal groups of Truview PCD, C-MAC, and Macintosh laryngoscopes, the POGO scores with Truview PCD were significantly higher than with Macintosh laryngoscopes (94.7 ± 12.9/82 ± 25.0/85.1 ± 17.1; $p < 0.01$).[20] No episode of desaturation or bradycardia had been seen in our study.

Because our study was an observational study, it lacked a control group and only evaluated a single video laryngoscope. Furthermore, MPVL was only explored in our study as a technique for intubating challenging hydrocephalous airway scenarios, not as a routine normal airway. To corroborate these findings, larger, well-designed randomized controlled studies in an unforeseen problematic airway segment of the population are needed. Nonetheless, our case study demonstrates that MPVL may play a role in increasing first-attempt success rates, intubation ease, and POGO scores of patients with a potentially challenging airway in the paediatric population.

The authors believe that MPVL can be looked upon

as a dependable device in patients with anticipated difficult airway as in infants with hydrocephalus.

Limitation- The larger randomized controlled trials are further required for the usefulness of MPVL in anticipated paediatric difficult airway.

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GUIDELINES TO CONTRIBUTORS

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Link the conclusions with the goals of the study but avoid unqualified statements and conclusions not completely supported by your data.

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References

The references of the article are the foundation on which the work of the study is built. They provide the scientific background that justifies your study, including the methods used. AAAR follows 'Vancouver style' of quoting the references as superscripts in which references are numbered consecutively in the order in which they are first mentioned in the text. Identify references in text, tables, and legends by Arabic numerals in parentheses. References cited only in tables or in legends to figure should be numbered in accordance with a sequence established by the first identification in the text of the particular table or figure. Use the style of the examples below, which are based with slight modifications on the formats used by the U S National Library of Medicine in Medline database. The titles of journals should be abbreviated according to the style used in Medline. The references must be verified by the authors(s)

against the original documents. Restrict references to those that have a direct bearing on the work described, preferably less than 25 for general articles and 6 for short communications.

Examples of correct forms of references are given below.

A. Journals:

1. Standard journal article List all authors, but if number exceeds six, list only first three and add et al.

   Fery AM, Haynes AR, Owen KJ, Farrall M, Jack LA, Lai LY, et al. Predisposing locus for Alzheimer's disease on chromosome 21, Lancet 1989; 1: 352-5.

2. Organisation as author : The Royal Marsden Hospital Bonemarrow Transplantation Team. Failure of syngeneic bonemarrow graft without preconditioning in post- hepatitis marrow aplasia. Lancet 1977; 2: 742-4.

3. No author given : Coffee drinking and cancer of the pancreas (editorial). BMJ 1981; 283:628.

B. Books and other Monographs

1. Personal author(s): Colson JH, Armour WJ. Sports injuries and their treatment, 2nd rev. ed. London: S. Paul, 1986.

2. Editor(s), compiler as authors : Diener HC, Wilkinson M, editors. Drug-induced headache. New York: Springer Verlag, 1988.

3. Chapters in a book: Weinstein L, Swartz MN. Pathologic properties of invading microorganisms. In:Sodeman WA Jr, Sodeman WA, editors. Pathologic physiology: mechanisms of disease. Philadelphia: Saunders, 1974: 457-72.

C. Other published Material

Newspaper article: Rensberger B, Specter B, CFCs may be destroyed by natural process. The Washington Post 1989 Aug. 7; Sect. A:2 (Col.5).

D. Unpublished Material

Lillywhite HD, Donald JA. Pulmonary blood flow regulation in an aquatic snake. Science. In press or Personal Communication

E. Internet References

Complete Website address and the location to be mentioned.

Tables

Do not include tables in the text.

Type each table, double-spaced on a separate sheet.

Number tables consecutively in the order of their first citation in the text and put a brief title for each. Give each table a short abbreviated heading, Mention explanatory matter as well as explanations of all non-standard abbreviations used in the table, in footnotes and not in the heading. Identify statistical measures of variations such as standard deviation and standard error of the mean. Indicate approximate position of each table in relation to the subject matter of the text right hand margin of the appropriate page of the manuscript. If you use data from another published or unpublished source, obtain permission and acknowledge fully. Maximum tables allowed in any manuscript is as follows:

Maximum tables allowance

General Article (excluding abstract)	6
Case Report	2
Brief Report	4
Technical Communication	5
Review Article	10
Medical Intelligence Article	6
Special Article	6
Editorial	1
Letter to the Editor	2

Illustrations (Figures)

Submit two complete sets of figures. Figures should be professionally drawn and photographed; free hand or typewritten lettering is unacceptable. Instead of original drawings, roentgenograms, and other material, send sharp, glossy, black and white photographic prints as mentioned earlier. Letters, numbers, and symbols should be clear and even throughout and of sufficient size that when reduced for publication each item will still be legible. Each figure should have a label pasted on its back indicating the number of the figure, author's name and top of the figure. Do not write on the back of figures or scratch or mark them by using paper clips. Figures should be numbered consecutively according to the order in which they have been first cited in the text. If a figure has been published, acknowledge the original source and submit written permission from the copyright holder to reproduce the material. Do not include these in the text. Indicate the appropriate position of each figure in relation to the subject matter of the text in the right hand margin of the appropriate page of manuscript.

Units of measurement

All measurements – length, height, weight and volume,etc. should be reported in metric units (metre, kilogram, or litre) or their decimal multiples. Temperatures should be given in degree Celsius. Blood pressure should be given in millimetres of mercury. All haematologic and clinical chemistry measurements should be reported in the metric system in terms of the International System of Units (SI).

Abbreviations and Symbols

Use only standard abbreviations. Avoid abbreviations in the title and abstract. The full term for which an abbreviation stands, for should precede its first use in the text unless it is a standard unit of measurement.

Correspondence

A. Letters to the editor include brief constructive comments concerning previously published articles or brief notations of general interest. The manuscripts must be double-spaced, and a title and two copies must be provided. Letters may be submitted at aaarjournal@gmail.com .

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Brief Report	1000 words
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Medical Intelligence Article	3000 words
Special Article	2000 words
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Manuscripts (including tables, figures, photographs,etc). accompanied by a covering letter should be signed by all the authors. The covering letter must provide an undertaking to the effect that (a) the article has not been published or submitted to or accepted for publication in any form in any other journal,(b) the authors vouch safe that the authorship of this article will not be contested by any one whose name (s) is/are not listed, (c) on acceptance the

article will become copyright of AAAR (d) the sequence of the names of co-authors (e) the manuscript has been read and approved by all the authors,(f) name, address and the email ID of the corresponding author (responsible for communication).On final preparation, two hard copies and a soft copy (CD) of manuscripts should be mailed to retaining one copy with the corresponding author. A letter of acceptance or otherwise, will normally be sent to the author within 3 (three) months. Articles which are not accepted cannot be sent to the author unless accompanied by adequate postage stamps.

A completed checklist must accompany each manuscript submitted to Asian Archives of Anaesthesiology and Resuscitation.

Check the manuscript before submission

General

1. `Two complete sets of manuscripts (including tables) are submitted.
2. A floppy disk or CD is submitted with two files: the complete manuscript and a separate file containing only the title page, abstract, and references.
3. Manuscript is typed double-spaced, with ample, left , justified, margins.
4. Pages are numbered consecutively, starting with the title page.

Title Page

1. On the first page are typed the title, author name(s) and major degree(s), and affiliation(s).
2. The name, address, telephone and FAX numbers, and E-mail address of the corresponding author are to be given.
3. The manuscript title is no longer than 100 characters (letters and spaces) and does not contain any abbreviations.
4. A short title (no more than 30 characters) is provided at the bottom of page for use as a running foot.

Summary

* An abstract is provided. For all kind of articles, this abstract is structured and limited to max.300 words.

References

1. References correspond to the specifications of the Uniform Requirements for Manuscripts Submitted to Biomedical Journals" promulgated by the International Committee of Medical Journal Editors.
2. References are identified in the text by superscript figures, eg., Miller.
3. Each reference is cited in the text. Those appearing in tables and figures should be cited in the text where the table or figure is mentioned.
4. References are numbered consecutively in the order in which they appear in the text. (Vancouver Style)
5. Unpublished data, personal communications, submitted manuscripts, statistical programs, papers presented at meetings, and non–peer-review publications are not listed in the bibliography.
6. The bibliography is typed double–spaced.
7. Abbreviations of Journal titles conform to those used in Index Medicus, National Library of Medicine.

Tables

1. Each table is typed on a separate sheet of paper with its title.
2. Tables are numbered with Arabic numerals.
3. Each table contains all necessary information in order that it may stand alone, independent of the text.
4. No table contains data that could be included in the text in several sentences.
5. Vertical lines are not used.
6. Irrelevant and extra tables must not be

included

Figures

1. Each figure is cited in the text.
2. Two sets are submitted of glossy prints of sonographs, photomicrographs, radiographs, color illustrations, or any other figure that might not reproduce well.
3. Two sets of glossy prints of other figures are submitted.
4. Figures have been prepared with the journal column size in mind.
5. Letters and identifying marks are clear and sharp, and the critical areas of radiographs and photomicrographs are identified.
6. Legends and explanatory material appear in the accompanying caption and not no the figure itself.
7. Legends are typed together on one page. Legends for photomicrographs include information regarding stain and magnification.
8. Nothing is written on the back of the figures. An adhesive label, designating the top, with the first author's name and number of the figure, is attached firmly to the back of the illustration.
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