# ANAESTHESIA UPDATE

An official publication of Indian Society of Anaesthesiologists, U.P. Chapter

Volume 14 Number 1 June 2011

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# Editorial
# HEART RATE VARIABILITY

**Dr. Anita Malik**

*Editor-in-Chief*

It is well known that autonomic response is the first human response to any intervention or to any physical, physiological, or psycho-emotional activity. Likewise, any pathological process will immediately provoke an ANS response. The SA node generates impulses about 100-120 times per minute at rest. However in healthy individual resting heart rate (HR) would never be that high due to continuous control of the autonomic nervous system (ANS) over the output of SA node activity, net regulatory effect of which gives real HR. So the main regulatory mechanism in Heart Rate Variability (HRV) is autonomic regulation.

The heart rate variability(HRV) analysis is a powerful tool in assessment of the autonomic function. It is accurate, reliable, reproducible, yet simple to measure and process. The source information for HRV is a continuous beat-by-beat measurement of interbeat intervals. The electrocardiograph (ECG) is considered as the best way to measure interbeat intervals. Rhythmography reflects HRV wave structure and serves as a "fingerprint" of autonomic regulatory mechanisms. The method is based on drawing the time intervals between consecutive heartbeats as straight vertical lines. The longer the interval between two heartbeats (RR), the longer the corresponding vertical line. When these lines are graphed sequentially, they form a Rhythmogram - a curve-specific wave portrait of RR Intervals Variability. Rhythmographic representation allows a great deal of information to be compressed in a simple picture.

There are two methods of analysis of HRV data: time-domain and frequency-domain analysis**.** Frequency-domain measures pertain to HR variability at certain frequency ranges associated with specific physiological processes. Sequence of RR intervals(cardiotachogram) is subjected to a standard spectral analysis and evaluation is of Total Power (TP), High Frequency (HF), Low Frequency (LF) and Very Low Frequency (VLF) on 5-min time interval while long-term data evaluates an additional frequency band - Ultra Low Frequency. The HF power spectrum (0.15 to 0.4 Hz.) band determines fluctuations caused by spontaneous respiration known as sinus arrhythmia and reflects parasympathetic (vagal) tone. The LF power spectrum ( 0.04 to 0.15 Hz.) baroreceptor activity, mediated by both the parasympathetic and sympathetic pathways. The VLF power spectrum (0.0033 to 0.04 Hz.) is complex, affected greatly by external influences, as well as peripheral vasomotor and chemoreceptor activity and the renin-angiotensin system. With longer recordings it reflects sympathetic tone as well as slower humoral and thermoregulatory effects while representation of various negative emotions, worries, rumination etc. in shorter recordings.The TP incorporates the combined influence of all possible physiological mechanisms contributing in HR variability that can be detected in 5-min recordings, however sympathetic tone is considered asprimary contributor.The LF/HF Ratio indicates balance between sympathetic and parasympathetic tone like a decrease in this score might indicate either increase in parasympathetic or decrease in sympathetic tone.

Marked physiologic signal variability and complexity is observed in young, healthy persons , whereas aging systems show a loss of variability, decreased complexity, and increased regularity[1]. It has been hypothesized that decreased variability of heart rate

dynamics may occur over a broad range of critical illness and injury diseased and may be inversely correlated with disease severity and outcome in both adult and pediatric patients. Decreased HRV was shown to be an independent predictor of prolonged hospitalization (>7 d) after abdominal aortic surgery[2]. In patients with documented or suspected coronary artery disease undergoing major noncardiac surgery an altered low-to-high frequency power ratio before induction of anaesthesia was a strong and independent predictor of both all-cause mortality and major cardiac events within 2 years[3]. Several studies with cardiac patients suggest that decreased HRV as well as baroreceptor dysfunction are more powerful predictors for cardiovascular mortality than established clinical predictors, such as left ventricular ejection fraction and ventricular premature complexes[4]. HRV is significantly reduced in patients with LVH secondary to hypertension or aortic valve disease. Cardiac vagal nerve activity is influenced by the arterial baroreflex. The amplitude of respiratory sinus arrhythmia (HRV) has been found to correlate with baroreflex sensitivity which is reduced in hypertension and diabetes. This reduction in baroreflex sensitivity is correlated with cardiac LVH. As HRV gives information about the sympathetic-parasympathetic autonomic balance and thus about the risk for sudden cardiac death (SCD) in diabetic patients.

HRV is also altered in a number of neurological conditions. It appears that HRV may reflect the functional state of the central nervous system in the setting of severe brain damage, and has been correlated with severity, survival and neurological outcome[1]. HRV has also been suggested as a complementary tool in the diagnosis of brainstem death. Cardiac autonomic dysfunction is associated with mortality in patients with end-stage renal disease[5]. It has been hypothesized that septic shock resulted in an uncoupling of organ system interconnectivity, and that the uncoupling phenomenon could be quantified as a loss in HRV[6]. Therefore, HRV method is unique in its ability to assess the impact of any intervention or activity and to detect the early signs of pathological developments or functional disorders, which may not be revealed by routine physical examination.

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# Review Article
# Human Patient Simulation (HPS): A powerful teaching tool

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Human patient simulation is a novel teaching method that allows trainees like medical, paramedical personnel, nursing staffs and people in various other fields like managers, executives, hospital trustees, regulators and legislators and others to apply their skills in different health care situations, practice and participate in learning experiences delivered to their educational needs. Simulated patient care scenarios help clinicians to learn skills, gain experience, learn to respond more effectively and develop competencies in a planned and prescribed manner. The great advantage of teaching on simulator is that learning is achieved without fear of harming a real patient.

Human patient simulator is a sophisticated, technologically innovated mannequin, available in adult and paediatric sizes, fully integrated with computer software, have lung, heart, and bowel sounds, peripheral pulses that respond to medical and pharmacological interventions with expected physiological responses. This teaching method provides proactive training while promoting team building, evaluate clinical outcomes, teach technical efficiencies, promote thinking skills, procedural experience, outcome analysis and team work in emergency situations. Clinicians have used human patient simulation as teaching equipment for learning with patient safety.

**Application**

Specifically, simulator training will be very useful in:

- Teaching basic skills to medical students such as respiratory physiology and cardiovascular haemodynamics.
- Training trainee doctors in basic anaesthesia skills before they administer anaesthesia to real patients.
- Crisis management with advanced clinical skills, e.g. management of difficult airways, tension pneumothorax, pulmonary embolism and shock etc.
- For experienced doctors, nurses and paramedics, particularly those who work in intensive care, emergency departments and operating theatres
- Demonstration of new drug and new equipment by pharmaceutical and medical equipment companies

**Simulator development**

The development of human patient simulators began in the late 1960s, and accelerated in the late 1980s and early 1990s. Abrahamson[1, 2], Denson and colleagues at the University of Southern California developed a patient stimulator referred to as Sim One.

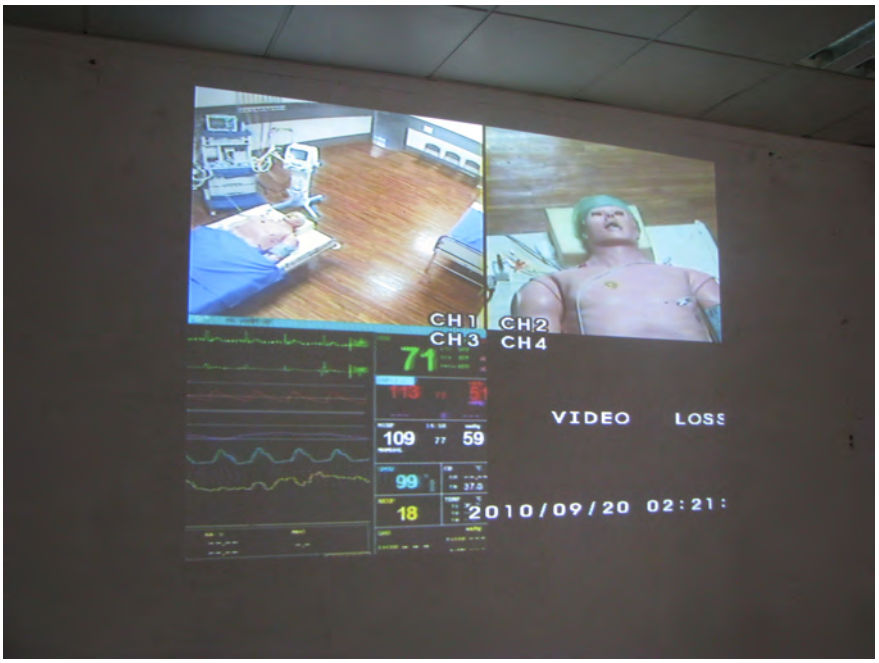
In the mid-1980s, teams of anaesthesiologists and engineers at the University of Florida created the Gainesville Anaesthesia Simulator (GAS).[3] the team at Stanford created the Comprehensive Anesthesia Simulation Environment (CASE) [4]. Throughout the late 1980s and early 1990s, both groups significantly enhanced their patient simulators with successive refinements, including simulating additional clinical features and developing additional educational applications.

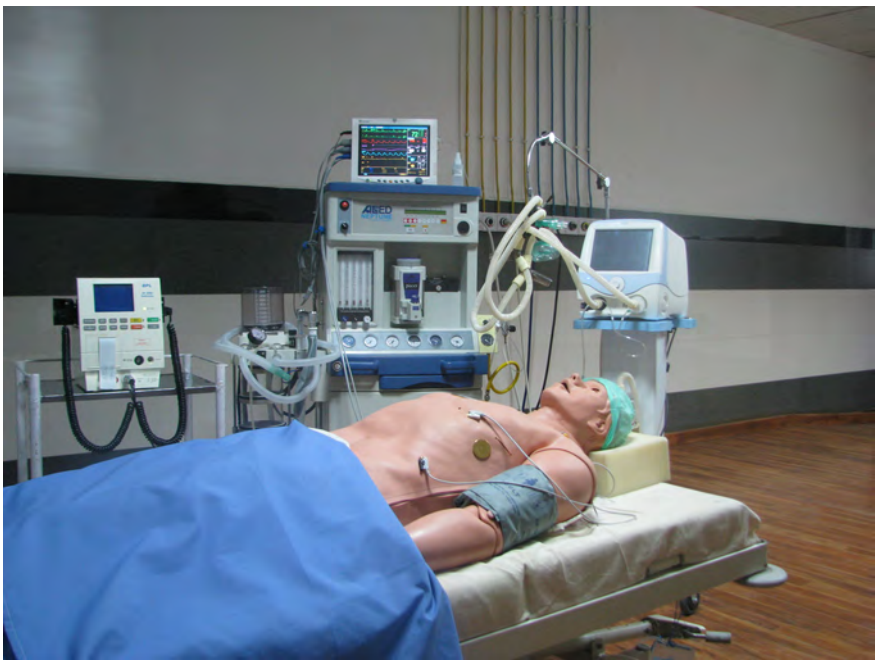
Modern-day patient simulators look and respond to interventions with ever-increasing degrees of realism.

The HPS can simulate accurately the patient's responses in many situations such as anaphylaxis; septic shock and heart failure, producing 'patterns' of physical signs and corresponding monitor data. These include heart sounds, central and peripheral pulses, muscle twitches, breathing sounds and urine output. Normal and abnormal sounds can be selected manually by instructors, or automatically in pre-programmed clinical scenarios. Pulses and heart tones are synchronized with the electrocardiogram, and breath sounds are synchronized with the rise and fall of the chest during each respiratory cycle.

The airway of the mannequin connects to a lung model, some of which are quite sophisticated, enabling the simulated patient to breathe spontaneously, receive assisted and controlled mechanical ventilation through a face mask or endotracheal tube, and to consume oxygen, exhale carbon dioxide and take up or exhale anaesthetic gases. The incorporation of such a high fidelity lung model allows the simulated patient to be connected

to sophisticated respiratory equipment such as mechanical ventilation systems, spirometers, manometers and gas analysers in a realistic manner and with realistic measurements obtained. Similarly, electromechanical and electro-optical actuators allow standard electrocardiographs, non-invasive blood pressure monitors, and pulse oximeters to be connected to the patient simulator with realistic measurements reported on the corresponding data displays. Human patient simulators have many critical care, airway rescue, cardiac and trauma resuscitation features. Invasive arterial, central venous and pulmonary artery pressure waveforms can be transmitted to and displayed on a standard physiological monitor. The neck of the simulator manikin permits transtracheal needle, catheter or tube placement, enabling transtracheal jet ventilation and emergency cricothyrotomy to be practiced. Electrical posts mounted on the chest of the mannequin enable electrical cardioversion and defibrillation to be performed using standard hospital equipment.



There are also pre-configured 'patients', in which the physiological model is customized for details such as the patients' age, body mass, blood pressure and smoking history. These

models can all be easily and quickly modified according to the training scenario e.g. If tension pneumothorax is suspected, needles can be introduced into the second intercostal space at the mid-clavicular line; if the diagnosis is correct, gas under pressure rushes from the needle as the pneumothorax decompresses. Related technology enables a needle appropriately advanced at the left xiphochondral junction to aspirate pericardial fluid and blood. Standard chest tubes can be placed through small slits in the lateral chest wall along the mid-axillary line. When the simulator's actuator system is charged with air, fluid or blood, these substances empty through the chest tube into the collection system. The drug recognition system can model in real time the patient's response to drugs. A bar code system enables detection of the drug administered and its dose.

Both clinical features and the engineering aspects of human patient simulators are continually improving. Paediatric patient simulators are already available commercially[5]. Simulator control hardware has become increasingly robust and compact, allowing the development of portable simulators that can be used to train and assess in the out-of-hospital setting.

**Key Components in Simulation**

- Simulation experiences comprise the actual simulation experience, debriefing, and evaluation.
- Each simulated experience must have clearly stated objectives that are presented to the student prior to engaging in the simulation experience.
- Students are required to prepare for a clinical simulation experience in the same manner as they would prepare for an actual patient care experience.
- An orientation to both the simulation technology and the environment is required.
- The simulation must challenge the student to use problem solving and critical reasoning skills to assess the situation and determine the correct interventions.
- The educator assumes the role of facilitator, providing cues when necessary, but is not an active participant in the simulation.
- The educator and the student should participate in an active debriefing. Facilitated by the educator, the debriefing should challenge the student to think critically about his/her practice and clinical judgment. The debriefing session should occur immediately after the simulation is completed so the thoughts and feelings of the learner are not forgotten and do not get distorted over time

**Advantages**

Kneebone[4] proposed four key advantages of simulator-based learning –

(1) The training agenda can be determined by the needs of the learner, not the patient.
(2) Junior doctors learn in a safe and controlled environment which enables them to gain confidence and understanding in order to treat real patients better. Because the environment is safe, learners have 'permission to fail' and to learn from such failure in a way that would be unthinkable in a clinical setting. This gives an opportunity to explore the limits of each technique rather than having to remain within the zone of clinical safety.
(3) Simulators can provide objective evidence of performance, using their in-built tracking functions to map a learner's trajectory in detail.
(4) The capacity of simulators to provide immediate feedback in digital form offers a potential for collaborative as well as individual learning.

**Limitations**

While rating the overall simulator-based educational experience highly, learners frequently cite the 'clinical realism' of the patient mannequin as an important limitation. For example, the simulator's skin colour does not change. This is a detractor in simulator-based training program for pre-hospital personnel who rely heavily on skin colour changes as a marker of successful interventions.

As a general rule, the higher the fidelity and the more realistic the model, the more expensive is the training tool.

A potential limitation of patient simulator-based learning is the reticence of physicians and other healthcare professionals to participate in active training models.

**Summary**

Human patient simulator technology has evolved rapidly over the past two decades. Contemporary patient simulators have numerous clinical features that can be

controlled by instructors to create a structured learning environment, a clinically realistic setting in which learning can take precedence over patient care. Using patient simulators, medical students and residents can acquire basic clinical skills while more advanced students and health care professionals in practice can acquire, refine and rehearse advanced clinical skills, both individually and in teams.

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**Original Article**

# MIDAZOLAM VERSUS PROPOFOL AS CONSCIOUS SEDATION AGENTS IN MINOR ORAL SURGERIES.

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**Abstract**

**Purpose**: The purpose of this study was to measure the safety and efficacy of propofol or midazolam combined with fentanyl as sedative agents during minor oral surgeries

**Patients and Methods**: A double-blind, prospective, randomized clinical trial involving 30 patients undergoing minor oral surgeries under intravenous sedation was performed. 15 Patients randomly received propofol and fentanyl (P + F) and 15 patients received midazolam and fentanyl (M + F). Patient demographics, Cooprative score,sedation score, VAS and physiologic parameters were determined intraoperatively. All medications were titrated to the same clinical end point for sedation.

**Results**: There were no significant differences in either patient demographics or surgical characteristics between groups. The P + F group was significantly less cooperative than the M + F group. Pain during injection of propofol was a significant adverse side effect. Both groups experienced a small percentage of apneic episodes, but mechanical ventilation was never required. not statistically

Sedation was statistically significant in P + F group than M + F group

**Conclusion**: Midazolam appears to be a safe and efficacious drug for use during outpatient oral surgical procedures.

Keywords-: Apnea, Fentanyl, Midazolam, Propofol, Sedation

## Introduction

Conscious sedation is when patients enter into a state where their level of consciousness seems to get altered. Conscious sedation is a method of depression of the central nervous system that allows the operator to perform a surgical procedure during which the patient retains protective reflexes[1]. Conscious sedation is exactly not a method of pain control but, in combination with local anesthesia, it is a safe alternative to general anesthesia for the control of perioperative pain and anxiety in outpatient surgery [2, 3]

Dental procedures including minor dental surgeries are associated with anxiety in close relation since years. The feeling of fear and anxiety is a psychological phenomenon and this phenomenon creates problem to the patients as well as to the dentists. A newer technique is developed in order to combat this problem which can be readily achieved without loss of consciousness by the use of sedation combined with local anaesthesia. Rationale behind using this combination is that the ideal anesthetic technique for ambulatory surgery should provide rapid onset and stable operating conditions, while ensuring rapid recovery of protective reflexes and cognitive and psychomotor functions**.**

Propofol is a short- acting intravenous anesthetic with a rapid onset of action, short elimination half-life, and inactive metabolites. Most studies advocate the use of propofol for general anesthesia, but a few have reported that propofol can be used for intravenous sedation during outpatient oral surgical procedures.[4,5] In fact, Meyers et al [4] concluded that propofol is superior to methohexital for intravenous deep sedation.

Midazolam and fentanyl are used by many oral and maxillofacial surgeons for sedation during the minor oral surgery. For this reason, aim of this study was to compare midazolam and propofol, each in combination with fentanyl, regarding its safety and efficacy as sedative agents during minor oral surgeries.

**Materials And Methods**

Thirty patients who required minor oral surgical procedures (like impaction, fracture reduction, intermaxillary fixation, apicoectomy etc.) under local anesthesia with ASA Grade I, II of both the sexes between ages 18 to 50 years,admitted to Oral and Maxillofacial Surgery O.P.D Career Post Graduate Institute of Dental Sciences and Hospital, Lucknow, were included in the study. With approval of ethical committee, written and informed consent was taken from each patient.

Patients with history of psychiatric illness, ASA grade III or IV, known alcoholic or drug abuse, pregnant and lactating women were excluded.

At the time of pre-anesthetic checkup, all the patients were instructed in the use of visual analogue score (VAS) and the procedure was explained to them regarding the nature and benefit of the study. Patients were instructed to fast 6-8 hours before their surgical appointment and to bring a responsible person to accompany them home after sedation.

30 patients were randomly selected either to propofol and fentanyl (Group P+F,n= 15) or midazolam and fentanyl ( Group M+F, n=15 ) I.V. sedation before entering the operation theatre. Study was double blinded as both the Anesthetist and the patient were blinded as to which drug/dose was administered.

In minor operation theatre an 18 or 20- gauge intravenous canula was placed. Intravenous fluids used were either normal saline or 5% dextrose in water.

1. The patient's baseline physiologic parameters (blood pressure, respiratory rate, pulse rate and oxygen saturation) were noted before administering any medications and

then recorded every 5 minutes until the end of the procedure.

8mg Dexamethasone was the first drug administered, followed by 100µg (2µg/kg) fentanyl delivered over 2 minutes. Subjects then randomly received either propofol inducing dose (400-500µg/kg) or midazolam inducing dose ( 0.05mg/kg) titrated to the same end point of slurred speech, lid ptosis and patient report of relaxation without loss of consciousness. Propofol was given intraoperatively through infusion pump @ 30-60ml/hr. Midazolam was repeated in bolus 1mg whenever required.

All patients received 2% Lidocaine with epinephrine (1:100,000,2-4 ml) to achieve local anesthesia. Efficacy of the local anesthesia was assessed by probing the buccal and lingual surface of the area. The surgical procedure began 5 minutes after completion of the local anesthesia. If the patient did not tolerate the procedure because of inadequate local anesthesia or inadequate sedation, the case was recorded as a drug failure.

2. At 5 and 15 minutes intra-operatively cooperative score was assessed in patients by staff nurse unknown to the study.

**Cooperative score** - :

a. Did the patient's movements during the local anesthesia or the extractions interfere or delay treatment?

-No interfering movements (0)

- Minor movements, positioning remained appropriate (1)

- Minor movements, patient had to be repositioned(2)

- Movements grossly interfered with the procedure (3)

b. To what extent did the patient verbalize discomfort during the procedure?

- Not at all (0)

- Some verbalization, but did not indicate pain or discomfort (1)

- Some verbalization indicating pain or discomfort (2)

- Complained frequently during the procedure (3)

c. Did the patient show nonverbal signs of discomfort during the procedure?

- Not at all (0)

- Slight discomfort, occasional grimaces (1) Moderate discomfort, feet/hands tensed, tears in eyes (2)

- Marked discomfort apparent during procedure (3)

3. The observer also rated the sedation through **sedation score,**:

- Awake =absent-

-Drowsy but arousal to verbal stimuli=mild-1

- Arousal on light touch= moderate-2-

-Arousal on firm touch=severe-3

4. Adverse side effects, including pain on injection of sedative agents, cardiac arrhythmias, and periods of apnea.

At completion of the surgical procedure the propofol infusion was discontinued.

5. Pain was assessed using visual analogue scale (VAS). 0-10 mm scale was used where 0 = no pain and 10 = maximum pain. After completion of the surgery, the patient was immediately transferred to a recovery room where postoperative data were collected by a nurse. Level of significance was set at P < .05 for all comparative analyses. An unpaired t-test was used to test for significant differences between the two study groups.

**Results**

Out of the 30 volunteers who met the inclusion and exclusion criteria, no subjects in the propofol group and in the midazolam group were excluded. The mean age, weight and sex distribution of 30 patients are listed in Table 1.

**Table1:DemographicProfileOfPatients.**

| | P+F (n=1 | | M+F (n=15) | | "p" |
|---|---|---|---|---|---|
| | Mean | SD | Mean | SD | |
| Age | 27.00 | 9.70 | 26.13 | 5.59 | 0.766 |
| Weight | 58.67 | 9.54 | 61.33 | 9.15 | 0.441 |
| Duration of surgery | 19.00 | 4.31 | 19.00 | 4.31 | 1.000 |

**Table 2: Comparison of Outcome Parameters in two groups**

| | P+F (n=15) | | M+F (n=15) | | Significance of difference | |
|---|---|---|---|---|---|---|
| Parameters | Mean | SD | Mean | SD | "t" | "p" |
| Pain score(VAS) | 1.27 | 0.96 | 0.87 | 0.99 | 1.122 | 0.271 |
| Cooperation score at 5 min | 0.67 | 1.23 | 0.00 | 0.00 | 2.092 | 0.046 |
| Cooperation score at 15 min | 2.07 | 1.22 | 2.13 | 1.13 | -0.155 | 0.878 |
| Sedation | 1.67 | 0.72 | 1.20 | 0.41 | 2.168 | 0.039 |

**Table 3:Adverse side effects in two groups**

| Adverse side effect | P+F(n=15) | M+F(n=15) |
|---|---|---|
| Apnea | 2(13.3%) | 1(6.67%) |
| Pain during injection | 4(26.67%) | 0( p< .05) |
| Cardiac arrthymias | 0 | 0 |

There were no statistically significant differences in the demographic profile between the groups. Preoperative baseline vital signs, which included blood pressure (BP), heart rate (HR), respiration rate (RR) & and oxygen saturation ($SaO_2$) were measured and no significant difference was found statistically.

Patients in the M + F group received a mean induction dose of 2.5mg midazolam with a mean bolus of 1.07 mg to complete an average 19.0-minute surgery. Patients in the P + F group received a mean induction dose of 423.7 ug/kg with a mean infusion rate of 159.29 ug/kg/min to complete an average 19 minute surgery. The amount of local anesthetic administered was similar between both groups (3.7 ml) .

**Figure 1**

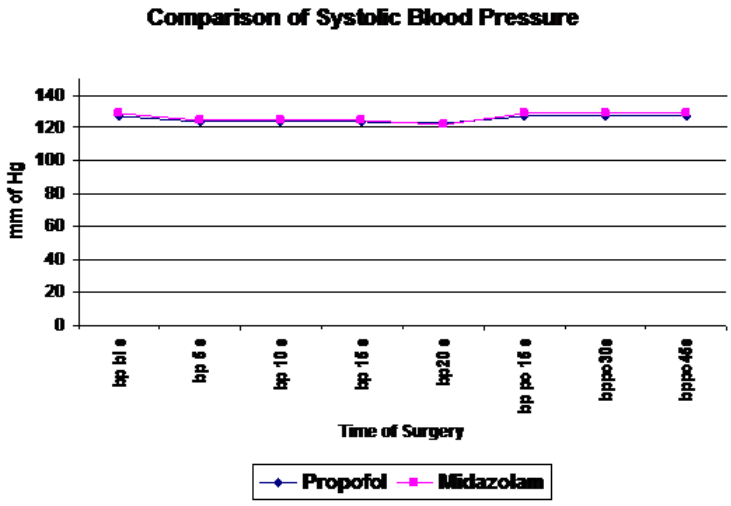
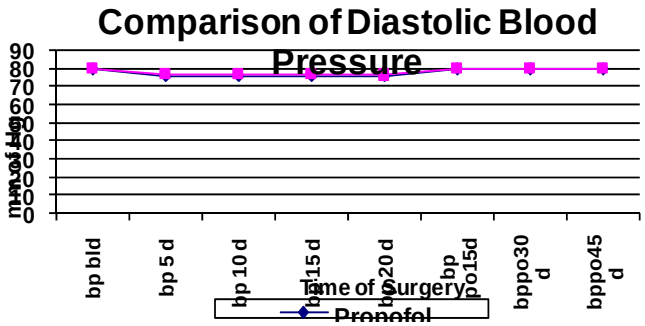
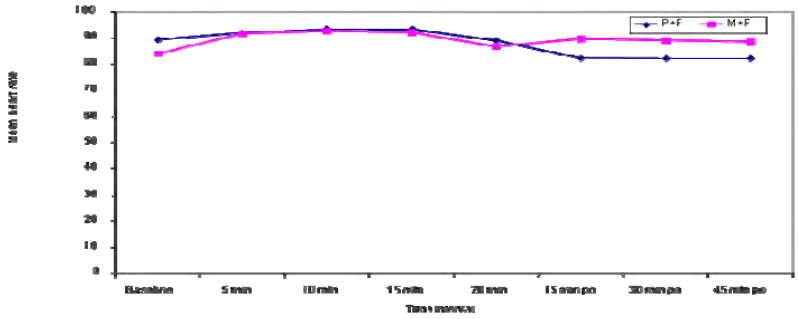



**Figure 2**




**Comparison of heart rate in two groups**

**Figure-3**




Regarding hemodynamic changes, both M+F and P+F group exhibited no signiticant difference in mean DBP and mean SBP from baseline at any time interval (p = >.05) (**Fig 1 and Fig 2).** There was a nominal increase in heart rate at 10 and 15 minutes intraoperatively, but these differences in heart rate from baseline among two groups was found to be non significant. **(Fig 3).** Qualitatively and clinically there were no

significant changes in heart rate when two groups were compared.

No significant difference between two groups was observed as regards pain score(VAS). At 5 min, the cooperation score was significantly higher in P+F group as compared to M+F group (p=0.046). The P + F group was significantly less cooperative than the M + F group at 5 minutes intra operatively. However, at 15 min time interval there was no significant difference between two groups(**Table 2**) .Sedation score was significantly higher in P+F group as compared to M+F group (p=0.039).

Regarding adverse effects, (**Table 3**) no significant respiratory depression was not recorded in any patient. There were no significant decrease in respiratory rate. Average oxygen saturation remained above 95% at the 5-minute intraoperative periods during the entire procedure in both groups. 2 subjects in the P + F group and 1 subject in the M+ F group had periods of apnea > 10 seconds. These patients began breathing when stimulated, and none required assisted ventilation. Pain on injection of propofol was reported by 26.7% of the patients (4 out of 15 patients) which was significant stastically when compared to midazolam group($p< 0.05$). Cardiac arrthymias were not recorded in any patient.

**Discussion**

The results of our present study suggest that midazolam is a safe and efficacious drug for sedation during outpatient oral surgical procedures. In present study,the mean induction dose of the M + F group (2.5 mg and a mean bolus of 1.07 mg) was less than the mean total dose of 4.7 mg of midazolam administered with fentanyl by parworth et al[6] during the removal of impacted third molars in 57 patients with a mean surgical time of 20.6 minutes. Similarly, the mean induction dose of the P † F group (423.7ug/kg with a mean infusion rate of 159.29 ug/kg/min) was higher than the mean infusion rate of 118 ug/kg/min reported by parworth et al for IV sedation in their study. Mean infusion dose in our study is also much higher than Rodrigo and Jonsson[5] et al i.e 83/ ug/kg/min. The difference between our study and that of Rodrigo and Jonsson[7] may be that during sedation verbal contact was maintained with patients in the latter study, whereas patients in our study were maintained at deeper levels of sedation.

The most common adverse side effect reported in this study was pain on injection of propofol (26.7% of the subjects). In contrast, none of the midazolam group patients reported pain on injection. The incidence of pain during injection of propofol for sedation has been reported to be in the range of 33% to 50%[8]. The exact mechanisms responsible for the pain is not known; however, one cause may be the activation of the kinin cascade system. Klement and Arndt[9] discovered that pain was caused by the drug itself rather than the formulation.

In our study, Apnea>10 secs was a second adverse side effect observed . There was 13.3% incidence of apnea in the P + F group and 6.67% incidence of apnea in the M + F group. Rationale behind less incidence of apnea in midazolam group could be due to use of low doses of midazolam and these results suggest that a dose depend relationship may exist and

higher dose of midazolam may be more likely to cause apnea[10]. Bailey et al[3] reported apnea for 15 seconds in 6 of 12 patients receiving fentanyl (2µg/kg) and midazolam (0.05 mg/kg) .Their study did not include surgical stimulation, and both drugs were given within a 1-minute interval. In our study, fentanyl was administered over 2 minutes followed by slow titration of midazolam. In contrast to our results, Dionnel[11] reported that 48% to 50% of subjects receiving 100 µg fentanyl and midazolam during the removal of impacted third molars showed apnea (>30 seconds). Candelaria and Smiths administered 10µg/kg of alfentanil and propofol (infusion rate of 150µg/kg/min) during outpatient general anesthesia, with no evidence of respiratory depression[4]. However, Shafer[12] stated that propofol was a potent respiratory depressant and should be administered for sedation only by anesthesiologists or other personnel trained in airway management.

In our study, hemodynamic parameters remained stable through- out induction, maintenance, and recovery in both groups. Changes in systolic, diastolic blood pressures and heart rate in both groups were statistically non-significant. The probable cause of this could be the use of low initial does of midazolam is 0.05 mg/kg followed by 1 mg bolus dose in our study. In other studies, induction of general anesthesia with midazolam and propofol produced a reduction in SBP and DBP[13]. Doses of propofol and midazolam adjusted for sedation generally do not produce cardio- vascular depression[14]. Rodrigo and fung[15] in 1999 indicated that midazolam causes slight reduction in SBP and DBP and slight increase in heart rate but these changes neither statistically significant nor clinically relevant. Benzodiazepine, and midazolam in particularly is free from side effect from cardiovascular and respiratory system in clinical doses. This again is proved in our study where M+F group showing minimal side effects.

The mean cooperation scores in the M + F group were significantly less than in the P + F group at 5 intraoperative minutes. The unblinded invesitigator's clinical impression was that most subjects receiving M + F were more comfortable during the procedure. These findings are similar to those of Rodrigo and Jonsson[7] who reported that 5 1% of patients receiving propofol for sedation exhibited increased talkativeness that sometimes interfered with the operative procedure. Differences in the cooperation scores cannot be explained by differences in pharmacokinetics between the two sedative techniques.

Sedation score was higher in P+F group than M+F group. Rodrigo and Jonsson[7] found that patients reported a significant preference for midazolam sedation compared with propofol ($P < .01$).

On the basis of this study, midazolam in clinical doses appears to be an safe and efficacious alternative to propofol for use as an intravenous sedative agent during the minor oral surgeries on an outpatient basis.

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# Evaluation of Trans-dermal Nicotine patch for Attenuation of venous cannulation pain

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**Summary**

Background: Venous cannulation pain, the first painful experience by the patient in operation room is often discomforting and stressful for both patients and health care professionals. Various pharmacological and non-pharmacological measures have been tried to minimize venous cannulation pain with variable success. The present study was planned to evaluate the efficacy of trans-dermal nicotine patch for attenuating venous cannulation pain.

**Methods**: Sixty adults (16-60 yrs), ASA physical status I and II, of either sex, undergoing laparoscopic cholecystectomy, were included in this prospective, randomized, double blind and placebo controlled clinical study. Patients were divided into 2 groups of 30 each. Control group: received placebo patch; Nicotine group: received trans-dermal nicotine patch. The patches were applied at the proposed venous cannulation site 1 hr prior to cannulation with 20 G IV cannula; venous cannulation pain was assessed on a visual analogue scale (VAS) of 0–100 mm (0 = no pain, 100 = worst possible pain). Data were analyzed using student's T test, chi square test, Mann Whitney U test and Fisher's exact test. $P < 0.05$ was considered significant.

**Results**: The incidence of venous cannulation pain in the nicotine group (63%) was significantly lower as compared to the control group (100%; $P<0.01$). Severity of venous cannulation pain [median VAS (inter-quartile range)] was also significantly reduced in the nicotine group 20 (30) as compared to the control group 50 (30) ($P<0.001$). Incidence of side effects were similar among the groups ($P>0.05$).

**Conclusion:** Application of trans-dermal nicotine patch at the venous cannulation site 1 h before venous cannulation decreases both the incidence and severity of venous cannulation pain.

**Key words:** Transdermal nicotine patch, venous cannulation painSection

**Introduction**

Humans have appreciated the beneficial properties of the tobacco plant product nicotine for thousands of years. These effects include alertness, reduced anxiety, muscle relaxation, and analgesia. The analgesic effect of nicotine has been shown in animals[1, 2] and humans[3]; it is thought to result from activation of native descending inhibitory pain pathways.[4-6] In fact, smokers exposed to a painful stimulus

(cold water immersion) showed increased pain thresholds after smoking their usual brand of cigarettes or those with high nicotine content, but not after smoking low-nicotine cigarettes.[7-9]

Venous cannulation pain, the first painful experience by any patient in operation room is a discomforting and stressful procedure for both the patient and health care professionals; pain and fear associated with this seemingly trivial procedure, assumes disproportionate magnitude sometimes. The discomfort associated with intravenous cannulation ranked fifth among the 33 low morbidity clinical outcomes by expert anesthesiologists when both clinical importance and frequency were considered.[10] Pharmacologically diverse group of drugs have been used to optimize patient comfort and satisfaction during venous cannulation with variable results;[11] Recently trans-dermal nicotine patch (TNP) has been reported to attenuate postoperative pain with variable results.[12-14] However, role of TNP for attenuating venous cannulation pain has not been evaluated; we therefore planned to evaluate the efficacy of TNP for attenuation of venous cannulation pain.

**Methods**:

This prospective, randomized, double blind and placebo controlled clinical study was started following approval from the institutional ethical committee. Sixty adult nonsmoker patients (16-60 yrs) of either sex, with ASA physical status I or II, scheduled for laparoscopic cholecystectomy under general anesthesia were included in this study. Nonsmokers were defined as those individuals who had never smoked regularly or who had successfully quit smoking for a minimum of 5 yr.[12]

Exclusion criteria included patients with impaired kidney or liver functions, history of drug or alcohol abuse, history of chronic pain or recent uses of analgesic/ daily intake of analgesics, uncontrolled medical disease (including diabetes mellitus, myocardial disease and hypertension), skin lesions at the site of application and history of intake of non steroidal anti-inflammatory drugs within 24 h prior to surgery.

Eligible patients who provided written informed consent to participate in the study were randomly allocated according to a computer generated table of random numbers, into 2 groups of 30 each. All patients were premedicated with tablet lorazepam 2 mg night before and morning of surgery. Patients in the control group received placebo patch and those in the nicotine group received transdermal nicotine patch (Alza Corporation, CA, USA) containing 21 mg nicotine with an absorption area of 20 $cm^2$; the placebo patch used was similar to the nicotine patch in appearance. All patches were applied at the proposed venous cannulation site on the dorsum of patient's non-dominant hand, 1 hr prior to venous cannulation. Patches were applied and removed by a preoperative staff nurse who was blinded to group allocation. Intravenous cannulation was performed by an anesthesia consultant (DG) who was unaware of the group allocation with a 20 G intravenous cannula (Poly Medicure LTD, INDIA). Patients whose vein could not be cannulated in the first attempt were considered as drop outs and

were not included for further assessment. Primary outcome was defined by incidence and severity of venous cannulation pain. Secondary outcome were defined as side effects like nausea, vomiting and sedation.

Table 1: Demographic data presented either as mean ± SD or numbers

| Groups / Variables | Control (n=30) | Nicotine (n=30) |
|---|---|---|
| Age (yr) | 47.8 ± 11.7 | 44.5 ± 10.3 |
| Weight (kg) | 61.5 ± 10.8 | 56.4 ± 9.4 |
| Sex (M/F) | 25/ 5 | 21/ 9 |

Table 2: Incidence of side effects; data are presented as numbers

| Groups / Variables | | Control (n=29) | Nicotine (n=27) |
|---|---|---|---|
| | | | |
| Nausea and vomiting | No | 17 | 13 |
| | Mild | 4 | 2 |
| | Moderate | 3 | 4 |
| | Severe | 5 | 8 |
| Patients requiring anti-emetic | | 8 | 12 |
| Sedation | | 0 | 0 |
| Application site reaction | | 1 | 3 |

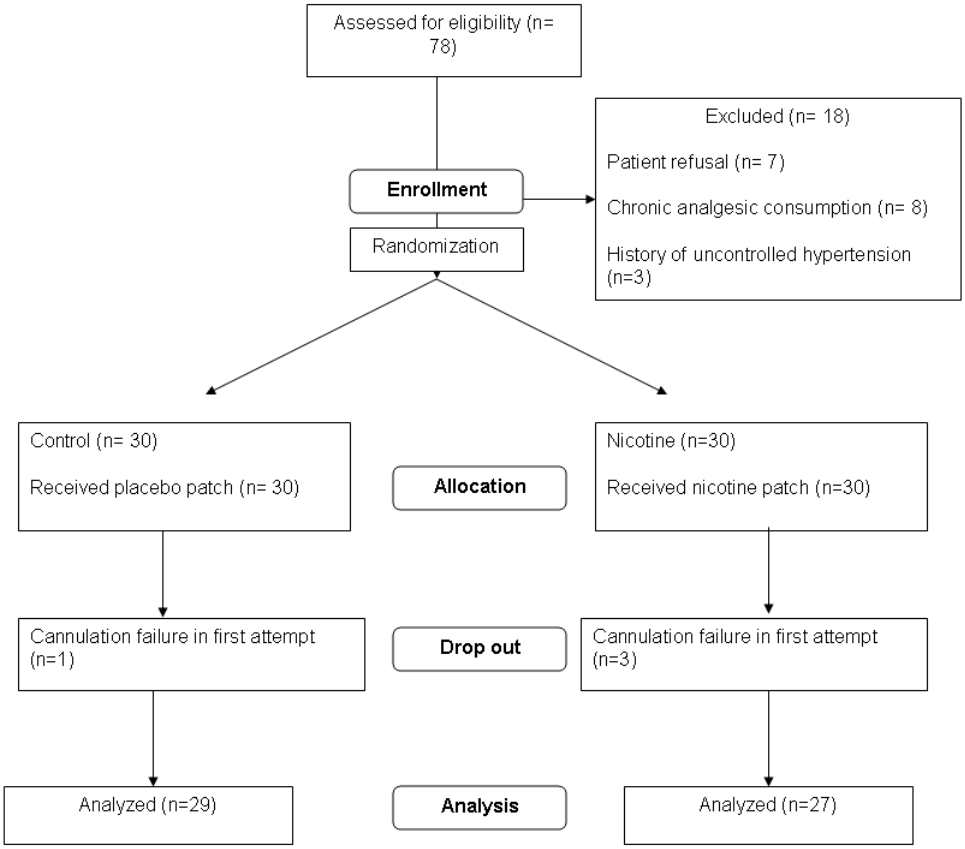
Anesthesia technique was standardized in all the groups. Patients were induced with fentanyl 3 μg - kg and propofol 2 mg - kg; orotracheal intubation was facilitated by vecuronium 0.08 μg - kg. Anesthesia was maintained with 100-200 μg - kg - min propofol infusion and 66% nitrous oxide in oxygen. At the end of surgery residual neuromuscular paralysis was antagonized with neostigmine 0.05mg – kg and glycopyrrolate 0.01 mg - kg. Following satisfactory recovery, the patients were extubated and shifted to the post-anesthesia care unit (PACU).

An anesthesia registrar (SG), blinded to group allocation, recorded the VAS scores immediate following venous cannulation and side effects including nausea, vomiting and sedation for a period of 24 hrs post-operatively at 6 hr intervals. Pain was measured on visual analogue scale (VAS) of 0–100 mm (0 = no pain, 100 = worst possible pain). The severity of nausea and vomiting was graded on a 4 point ordinal scale (0 = no nausea or vomiting, 1 = mild nausea, 2 = moderate nausea, and 3 = severe nausea with vomiting). Rescue antiemetic ondansetron 4 mg IV, was given to all patients with nausea and vomiting of grade ≥2. The Ramsay sedation scale (Awake levels were: 1- anxious, agitated or restless; 2- cooperative, oriented and tranquil; 3- responds to command; asleep levels were dependent on patient's response to a light glabellar tap or loud auditory stimulus; 4- brisk response; 5- a sluggish response; 6- no response) was used to assess the sedation;[15] Patients with a sedation scale of ≥ 4 were considered as sedated. The

site of venous cannulation was observed for the presence of application site reactions (ASR) including itching, erythema, irritation and edema at the time of cannulation and thereafter, up to a period of 24 hrs postoperatively at 6 hr intervals.

**Legends for figures**

Figure 1




Study Design

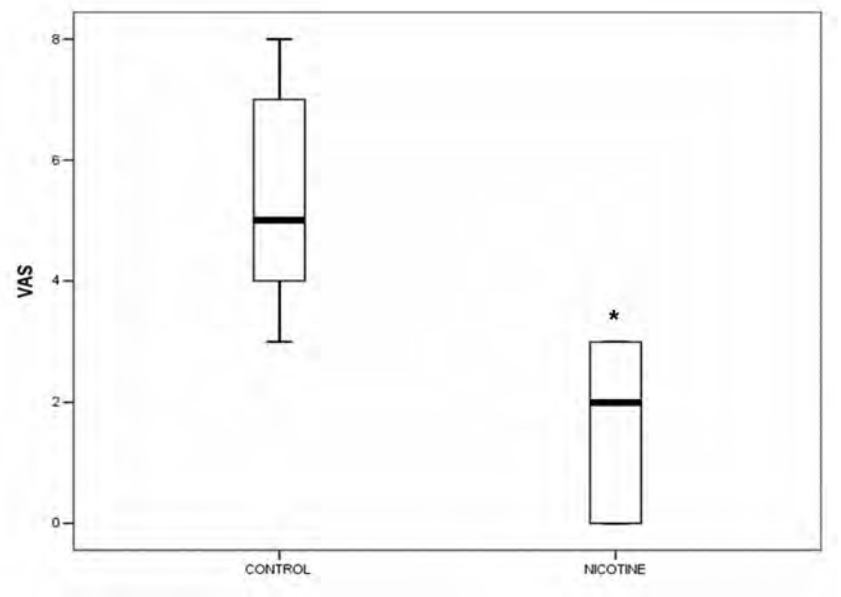
Calculation of sample size was based on the presumption that pain scores during venous cannulation in the nicotine group would be 30 as compared to 45 in the control group with a standard deviation of 20. For the results to be of clinical significance with $\alpha = 0.05$ and power of 80%, one needed to recruit 25 patients in each group. To take care of any drop outs we enrolled 30 patients in each group. Demographic data were analyzed with student's T test for continuous variables and chi square test for categorical variables. The median VAS pain scores were analyzed with Mann Whitney U test; the incidence of side effects was analyzed with Fisher's exact test. The package SPSS 14.0 (SPSS Inc, Chicago, IL) was used for statistical analysis. $P < 0.05$ was considered significant.

**Results**:

A total of 78 patients were assessed for eligibility from December 2007 to August 2008 (Fig 1), out of which 60 patients were included in the study after randomization (Fig. 1). Eighteen patients were excluded from this study on account of patient's refusal (seven

patients), history of uncontrolled hypertension (three patients) and chronic analgesic consumption (eight patients). Four patients were excluded from the study following initial randomization and considered as drop out, on account of failure to be cannulated in first attempt (Fig 1); their data has been included for the comparison of demographic profile, however, they were not subjected to further statistical analysis. Fifty six patients (94%) completed the study (control {29}, nicotine {27}) and were subjected to statistical analysis. There was no difference amongst the groups with regard to demographic variables (P>0.05) (Table 1).

Figure 2




**Venous cannulation pain as assessed by visual analogue scale (VAS). Data are presented as median (inter-quartile range). * denotes P<0.05 between groups.**

The incidence of venous cannulation pain in the nicotine group was significantly lower i.e. 63% (17/27) as compared to 100% (29/29) observed in the control group (P<0.05). Severity of venous cannulation pain presented as median (inter-quartile range); was also significantly reduced in the nicotine group 20 (30) as compared to the control group 50 (30) (P<0.05) (Fig. 2).

Incidence of nausea and vomiting, number of patients requiring anti-emetics and incidence of sedation were similar among the groups (P>0.05) (Table 2). One patient in the control group reported of itching as compared to 3 patients in the nicotine group who developed ASR [irritation (2) + erythema (1)]; however, this difference was statistically non-significant (P>0.05) (Table 2). Absolute risk reduction and the number needed to treat in the nicotine group was 37% and 3, respectively in relation to incidence of venous cannulation pain.

Discussion:

We observed that the application of transdermal nicotine patch at the venous cannulation site 1 h prior to venous cannulation

decreases both the incidence and severity of venous cannulation pain.

There is strong evidence that the anti-nociceptive effect of nicotine can occur via activation of acetylcholine nicotinic receptor expressed in a variety of brain loci and spinal cord.[16] Activation of cholinergic pathways by nicotine has been shown to elicit anti-nociceptive effects in a variety of acute and chronic pain models.[17] Nicotinic receptors (nAChRs) are abundant in different CNS region, where they are shown to regulate the release of various neurotransmitters, including serotonin, nor-epinephrine, glutamate, GABA and glycine.[18-20] The role of nAChRs in modulating pain transmission has been reported by a number of studies. Studies with knockout mice deficient in the α4β2 nAChRs subunits showed a reduced anti-nociceptive effect in a behavior study suggesting an important role of $\alpha_4\beta_2$ neuronal subtypes in nicotine-induced anti-nociception in acute pain models.[21] Studies also suggest that α4β2, α7 nAChRs, and another undefined subtype of nAchRs are involved in regulating GABA and/or glycine release in the deep lamina of the spinal cord dorsal horn in adult animals.[22] More recently, Cordero-Erausquin et al, using electrophysiological and molecular approaches, confirmed spinal $\alpha_4\beta_2$ and $\alpha_3\beta_2$ neuronal subtypes as possible targets for nicotinic analgesia.[23] Mechanisms that contribute to nAChR-mediated analgesic effects, include the desensitization of nAChRs on nociceptive primary afferent fibers, the increase of nor-adrenaline and serotonin release within the spinal cord, the activation of the descending inhibitory pathways,[24, 25] and the increases of GABA and glycine release from inhibitory inter-neurons in the superficial spinal cord dorsal horn.[26]

The neural pathways involved in the anti-nociception induced by nicotine include some peripheral pathways besides central cholinergic pathways. Study using two separate methods to assess nicotine induced anti-nociception for its central and peripheral action indicated that the analgesic effects of nicotine also depend on the action of nicotine at peripheral receptors or the functional integrity of those receptors involving partially separate pathways.[17] In the present study we have observed that topical application of TNP decreases venous cannulation pain; both the peripheral and central mode of nicotine's anti-nociceptive action may have contributed to this effect. Further clinical trials are essential to assess the individual role of central and peripheral pathways in mediation of analgesia.

Nicotine is suitable for transdermal therapy because it is volatile, highly lipid soluble, and permeates the skin easily.[27] Trans-dermal patches can deliver nicotine directly to systemic circulation through the intact skin, thus avoiding hepatic first-pass metabolism. Transdermal delivery of nicotine has been found to be efficacious in facilitating smoking cessation. A dose response for smoking cessation has been demonstrated for transdermal nicotine systems ranging from 7-21 mg daily,[27] suggesting that certain minimal nicotine levels are needed to optimize efficacy for some individuals. We have used the upper limit (i.e. 21 mg) of this range in the present study. The timing of application of TNP was

chosen similar to the timing of other therapeutic options commonly used to reduce venous cannulation pain. Recently a number of studies have evaluated the efficacy of TNP applied 1 h prior to surgery on postoperative pain relief with variable results.[12-14]

Nicotine patches are considered to be safe and well tolerated.[28, 29] The common ASR includes itching, irritation and erythema; three patients in the present study developed ASR of mild nature (1 patient in the control group and 3 patients in the nicotine group). These ASR were mild in nature and were not a matter of concern; and were statistically non-significant (P>0.05). The cardiovascular events as a result of autonomic stimulation include an increase in heart rate and blood pressure. Incidence of cardiovascular adverse events associated with nicotine patch has been observed to be very small;[30] moreover, several randomized controlled trials support the nicotine patch usage even in patients with cardiovascular disease.[31, 32] Nausea and vomiting is also frequently observed with the use of nicotine patch;[33] however, in the present study we did not observe any significant difference between the incidence of nausea and vomiting between the 2 groups.

The limitations of the current study are that it lacks the dose response design; hence dose–response relationship for the analgesic effect of nicotine could not be assessed. The timing of application of TNP was 1 h prior to venous cannulation; further studies are suggested to evaluate the best effective time interval prior to venous cannulation. We haven't measured nicotine levels which would have provided information regarding nicotine's pharmacokinetic and pharmacodynamic relationships. We have not included smokers in our study; hence results of the present study could not be extrapolated to smokers on account of nicotine tolerance.

In conclusion, the application of TNP at the venous cannulation site 1 h before venous cannulation decreased both the incidence and severity of cannulation pain; we therefore suggest that the application of a transdermal nicotine patch at the venous cannulation site is an effective method of decreasing both the incidence and severity of venous cannulation pain.

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**Case Report:**

# Role of dexmedetomidine in geriatric age group with multiple comorbid conditions during laproscopic surgery

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**Introduction:**

The use of Laproscopic technique in general surgery has gained increasing popularity because of several benefits to the patients like,the small limited incision, faster recovery, reduces postoperative analgesic requirement, length of hospital stay, there by decreases overall health cost.

Laproscopic surgery in geriatric age group is always challenging for anaesthesiologists because of alteration in physiology, changes in the pharmacokinetics and phamacodynamics of anaesthetic medications and associated comorbid conditions like hypertension, diabetes mellites, ischemic heart disease and malignancy etc. Before taking up such patient for surgery anaesthetist must have clear understanding of the procedure and its problems. Our concern in such type of patient is optimal timing of operation and improvement of mortality and morbidity associated with surgery and anaesthesia.

We are presenting a case report on use of dexmedetomidine in geriatric age group associated with multiple comorbid conditions.

Dexmedetomidine is a highly selective, potent alpha2 adrenergic receptor agonist, with a short duration of action,unique property of providing analgesia and sedation while maintaining patient arousability and respiratory function. Other properties are sypatholytic, anxiolytic and antisialogouge effect.

**Case Report:**

A 76 years old lady weighing 78kg presented for laproscopic cholecystectomy. Her medical history was makeable. She was a known case of diabetes mellitus for 15 years, asthma for 10 years, hypertension for 5years, and hyperthyroidism for 5 years. Her physical examination was normal. Base line vitals were, heart rate-86/min, blood pressure-170/104mmHg.Fasting blood sugar was 104mg/dl and thyroid function test was also within normal limits.

She was nil per oral for 8 hours and asked to take morning dose of antihypertensives(diuretics +Calcium channel blocker), Carbimazole for hyperthyroidism with a sip of water, Inhaler which she has been using(beta2 agonist + steroid) for last 10 years.

In operation theatre, routine monitors [pulse oximetry, NIBP, ECG, Precordial stethoscope] were placed and a 20G catheter was inserted in a left long vein. We had sedated the patient with intravenous( i.v) infusion of dexmedetomidine with a loading dose of 1 mcg/kg over 10 minutes ,followed by maintenance dose of 0.2- 1.0mcg/kg/hr. The patient was premedicated with fentanyl in dose of 1mcg/ kg i.v.,anaesthesia was induced with propofol 1.5mg/kg i.v. and vecuronium 0.1mg/kg i.v patient was intubated with a 7.0mm ID cuffed endotracheal tube.Anaesthesia was maintained with 0.6-1% isoflurane and oxygen-nitrous(3:3) , vecuronium 0.01-0.02mg/kg and dexmedetomidine in dose of 0.2-1.0mcg/kg/hr.A urinary bladder catheter and nasogastric tube were placed.Ventilation was adjusted to keep the end tidal CO2 concentration between 28-32mmHg.The operation was proceeded uneventfuly using standard operative technique. The blood pressure and heart rate were maintained between 110/70- 126/82 and 58-64beats/minutes respectively.

After successful cholecystectomy, neuromuscular block was reversed with neostigmine(3.5mg) and glycopyrolate (.6mg) and patient was extubated. Patient was kept in post anaesthesia care unit for 8 hours, with venti mask at 2l/min for 2hrs.Her vitals and saturation was maintained throughout post- op period. VAS SCORE was observed on 1st post operative day it was between 3&4 .Patient demanded for analgesia after 8hrs of surgery. Inj. Tramadol and ondensetarone was used as rescue analgesic and antiemetic respectively. Total analgesic requirement in 1st 24 hrs was 100mg.Patient was ambulated next day of surgery and was discharged post-op day 3rd after ingestion of regular diet. Analgesia and amnesia was satisfactory. Ambulation was early and cardiovascular response was good. She was recovered completely by post-op day 5 and returned to her daily routine work on the same week. Liver function test was normal on post-op day 1.

**Discussion:**

Laproscopic cholecystectomy is indicated in patient with symptomatic cholelithiasis, manifested by biliary colic and chronic cholecystitis.The potential benefits of Laproscopic cholecystectomy as compared to traditional open technique are:-1) Reduction in length of incision.2)Reduction in post operative pain.3) Early return to post-op activity and employment.4)Cost saving due to reduction of length of hospital stay,less use of analgesia and early return to employment.

Laproscopic cholecystectomy associated with high peak airway pressure ,decrease functional residual capacity and pulmonary alveoli atelactesis[3].These problem can be ameliorated by keeping endtidal CO2 between 30-35 mm Hg and increase minute ventilation[4,5].There is a risk of cardiac arrhythmias due to increase in PaCO2 and chances increases with halothane

so,we have used isoflurane inspite of potent bronchodialater activity of halothane.Isoflurane also has brochodialator activity but less chances of arrythmia as compared to halothane[6].

The idea behind using Dexmedetomidine in this case was its various properties like it produces analgesia, sedation, anxiolysis thus blunts cardiovascular response to laryngoscopy,CO2 inflation,surgical handling of tissues which can leads to fatal complications like myocardial infarction,stroke or arrhythmias specificaly in our patient having multiple co-morbid conditions.

Dexmedetomidine is a alpha2 adrenergic receptor agonist causes presynaptic activation of this receptor there by inhibits the release of norepinephrine,terminating the propagation of pain signals and inhibits sympathetic activity and thus can decrease blood pressure and heart rate[7]. These haemodynamic effects may also be observed in the postoperative period, and can be easily managed with atropine, ephedrine and volume infusion[7] Its major sympatholytic ,sedative and antinociceptive effect also attributable to its agonism of the alpha2 receptor in locus coeruleus. We didn't use any other premedication drug as dexmedetomidine itself have very good amnestic and antisialogouge property .Unlike other sedatives its unique property produces sedation without respiratory depression,which is very advantageous in COPD patients.Dexmedetomidine reduces requirement for volatile anaesthetics,sedatives and analgesics[1].

Dexmedetomidine also provides intense analgesia during the postoperative period. In one study,[2] the postoperative analgesic requirements were reduced by 50% in cardiac patients and the need for rescue midazolam for sedation was diminished by 80%.

Alpha2-Adrenoceptor stimulation with intravenous dexmedetomidine completely blocked histamine-induced bronchoconstriction in dogs. Therefore, dexmedetomidine might be beneficial to decrease airway reactivity in patients with chronic obstructive pulmonary disease or asthma7.

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# INTRAOPERATIVE BRADYCARDIA AND NEAR ASYSTOLE IN A CHILD AFTER ONDANSETRON- A CASE REPORT.

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**Introduction-**

The 5-hydroxytryptamine$_3$ (5HT$_3$) receptor antagonist[1], Ondansetron, is used safely in the management of post operative and chemotherapy induced vomiting[2, 3]. Large studies have established clinical safety of intravenous and oral ondansetron even in children [3-6]. Only possibilities of cardiovascular adverse effects like myocardial infarction[7] and arrhythmias such as atrial fibrillation[8] and ventricular tachycardia[9] were reported in adults. We report a case of severe intraoperative sinus bradycardia after intravenous ondansetron administration in a child. Consent for publication of this report was received in writing from the child's mother in local language (Hindi).

**Case report-**

A five-year old 13 kg girl was posted in emergency for repair of corneal perforation in our hospital. She was otherwise healthy and had no allergies. The pre-anesthetic checkups were unremarkable. She had heart rate (HR) of 110/min and blood pressure (BP) of 110/70 mm Hg. As the child was afebrile, had normal vital signs and posted for emergency, except hemoglobin no other investigations were performed preoperatively.

The patient had an intravenous access in forearm, so we preferred intravenous fentanyl (1µg/kg), propofol (2mg/kg) for induction with glycopyrrolate (0.04mg/kg) as antisecretary premedication. We intubated her trachea uneventfully with appropriate size uncuffed endotracheal tube (5mm) under vecuronium (0.1mg/kg). Anaesthesia was maintained with halothane 0.5% and nitrous oxide 50% in oxygen. A normal end-tidal $CO_2$ concentration was maintained by means of positive pressure ventilation. No baseline abnormalities were appreciated on the 3-lead electrocardiogram (ECG). Although blood loss was minimal, crystalloid 200 ml (20 ml/kg) was administered during the 45 min procedure. 15 minutes before extubation, when the stitches were in progress, halothane was stopped. Then, 1.5 mg of ondansetron (0.1 mg/kg) was administered (as per our institution's protocol for paediatric patients) intravenously slowly to prevent post-operative nausea and vomiting. Within two

minutes ECG monitor alarmed. Sinus bradycardia showing a HR of 20/minute was noted. Immediately, peripheral pulses were checked, they were very feeble. HR was confirmed by precordial stethoscope. Her BP at that time was unrecordable and end tidal $CO_2$ was decreased. A working diagnosis of occulocardiac reflex (OCR) was made and pre-drawn atropine 0.2 mg was administered intravenously immediately and asked the surgeon to stop for a few minutes. The lung was ventilated with 100% oxygen. Within thirty seconds of atropine administration, the patient regained HR of 100/minute and BP of 100/56mm Hg and normal end tidal $CO_2$. ABG shows normal oxygen and $CO_2$ concentration in arterial blood. Unfortunately, no rhythm strip can be printed. Surgeon strongly denied any extra-ocular muscle or ocular compression during this episode. The patient was extubated cautiously. We confirmed good respiratory effort and adequate cough of the patient during extubation. She was shifted to recovery room. Vital signs remained stable in the post operative hours and there was no nausea or vomiting. Postoperatively 12 lead ECG showed incomplete right bundle branch block. Transthoracic echocardiography showed small osteum secondum type of atrial septal defect (figure 1). As the patient was with isolated small defect and was asymptomatic, no specific medical treatment was necessary. She is now in follow up with cardiology department.

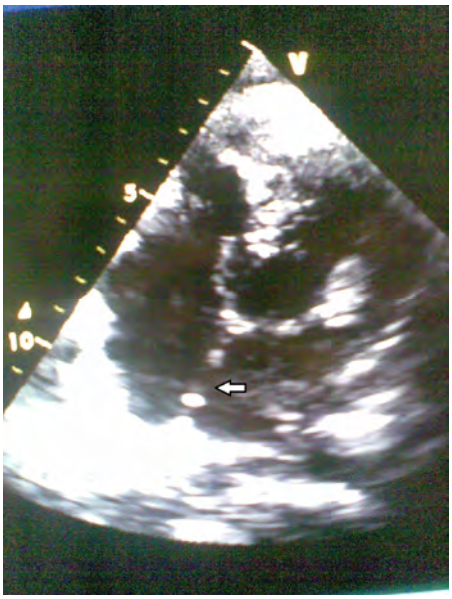
**Discussion-**

Sudden bradycardia in intraoperative period under general anaesthesia includes hypoxemia, light plane of anaesthesia, different cardiovascular reflexes, young age (children) and pharmacological agents like vecuronium[10], beta blockers, α2 agonists and potent narcotic[11]. In our case, the child was neither hypoxemic nor in light plane of anaesthesia and except ondansetron no other pharmacological agent was used at that time.

Ondansetron is a well known safe 5-$HT_3$ receptor antagonist but known to cause cardiac arrhythmias by several mechanisms[8, 9]. 5-$HT_3$ receptors are ligand gated ion channels located on presynaptic terminals of autonomic nervous system[12]. The cardiovascular effects through serotonin receptors are complex. Bradycardia can occur by the parasympathetic nervous systems mediated actions[13]. Recently it is reported; the sub-micromolecular affinity of ondansetron to human ether a-go-go-related gene (HERG) encoded K+ channel underlies the prolongation of cardiac repolarisation and QT prologation[14]. Secondly, the cardiovascular effects of serotonin are mediated by $5HT_{1-4}$ receptors, which are distributed throughout the cardio vascular system. $5HT_3$ receptors mediate Bezold-Zarish reflex, which is an autonomic reflex consisting of bradycardia and hypotension. Being a 5-$HT_3$ antagonist, ondansetron attenuates this reflect. Although animal studies strongly support the role of 5-$HT_3$ antagonists in preventing the Bezold Jarisch Reflex, they are yet to be established in humans [15].

Cardiovascular reflex like OCR may cause sudden bradycardia in intraoperative period. This trigeminovagal reflex occurs following manipulation on eye, especially after traction of external eye muscles. The afferent pathway is

via ciliary ganglion to ophthalmic division of trigeminal nerve and through gasserian ganglion to main sensory nucleus in the fourth ventricle. The efferent pathway is via the vagus nerve[16].




Sinus node function was studied previously[17] and atrial septal defect can cause atrial tachycardia per se. Sinus bradycardia is particularly common in early post operative periods of septal defect repair.

Though the cause of the event is inconclusive in our case, we presume it was possibly due to ondansetron. Because, we could not establish any traction in extra-ocular muscle and prophylactic anti cholinergic, as per recommendation[18] for OCR were given to the patient pre-operatively.

Further literature search revealed ondansetron induced bradycardia was reported as a case report in 2008[15]. Further studies are required to confirm ondansetron induced brady-arrhythmia and its clinical safety in paediatric age group.

Through this case report, our message is ondansetron should be used cautiously, especially in paediatric age group. Intraoperative ECG monitoring is life saving in our case, thus it must be used in ophthalmic surgical cases under anaesthesia.

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Anaesthesia Update
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# Anesthesia In A Patient Of Situs Inversus Totalis With Epigastric Hernia - A Case Report

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**Abstract**

Situs inversus totalis is a rare anomaly and it may be found incidentally on pre anesthetic workup of patients posted for routine surgeries. Such patients may have been asymptomatic but excluding possibilities of other associated anomalies is important for preventing any anesthetic mishap. We report a 65 years old female having situs inversus totalis with epigastric hernia for hernia repair under general anesthesia.

**Key words** : situs inversus totalis, epigastric hernia, general anesthesia.

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**Introduction**

Situs inversus is a congenital positional anomaly wherein there is complete reversal of abdominal organs, and they appear in mirror image. When this is associated with a right sided heart or dextrocardia it is called situs inversus totalis

The incidence is 1 in 10000 [1]. Generally such patients are asymptomatic with normal life expectancy. The association of situs inversus and ciliary dyskinesia is known as kartagener syndrome and is seen in 20% of cases [2].

3 – 5% patients may have various heart diseases ( Atrial Septal Defect, Ventricular Septal Defect, Transposition of Great Vessels, absent coronary sinus, Double Outlet Right Ventricle, Total Anomalous Pulmonary Venous Connection, pulmonary valve stenosis [3].

We describe a case of situs inversus totalis with epigastric hernia who was operated under general anesthesia.

**Case report**

We describe a case of a 65 years old 50 kg non diabetic, non hypertensive female patient admitted in Nehru hospital, BRD medical college, Gorakhpur with non reducing painful epigastric swelling.

On preanesthetic check-up her general physical examination were normal and vitals were stable.

Her chest examination revealed bilateral normal vesicular breath sounds and no crepitations or wheeze were present.

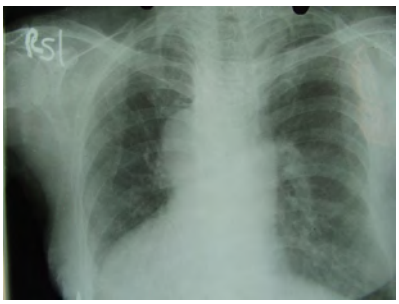

Fig 1: X-ray PA view of chest showing dextrocardia.

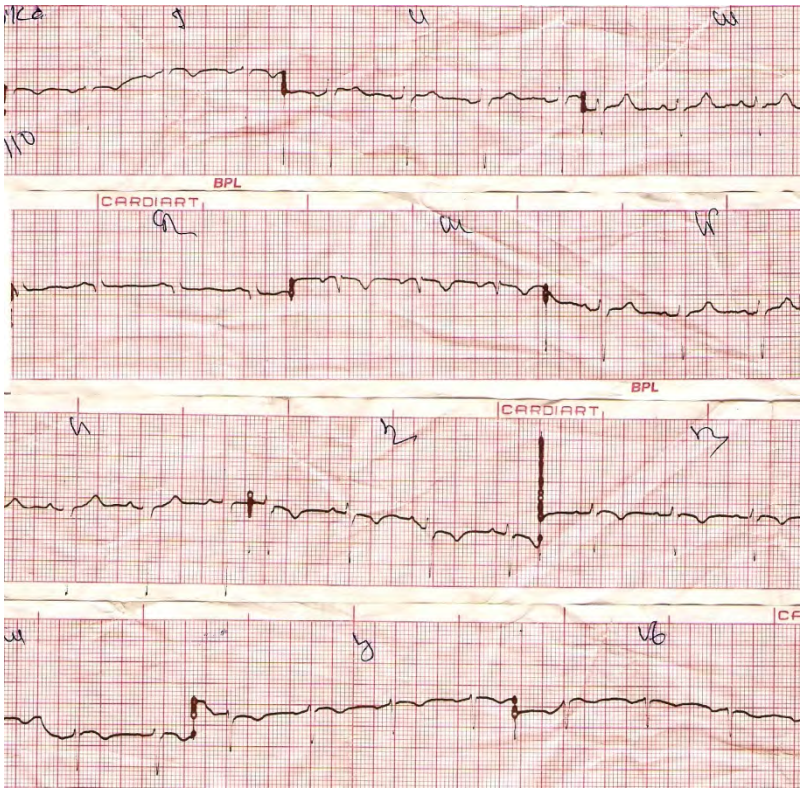


Fig 2: ECG showing reverse pattern of situs inversus

On cardiovascular examination she was incidentally found to have apex beat on right 5th intercostal space half inch medial to midclavicular line with normal 1st and 2nd heart sounds.

Liver dullness was found to be present on left side and a tympanic note was present on the right hypochondrium.

Airway assessment revealed no apparent anomalies and Mallampatti grade was one, with adequate neck mobility.

All haematological and biochemical parameters were within normal limits. Her chest x-ray (PA view) showed cardiac apex pointing to the right (dextrocardia) with normal heart size. The aortic arch was present on the right side while trachea was shifted to the left (figure 1).

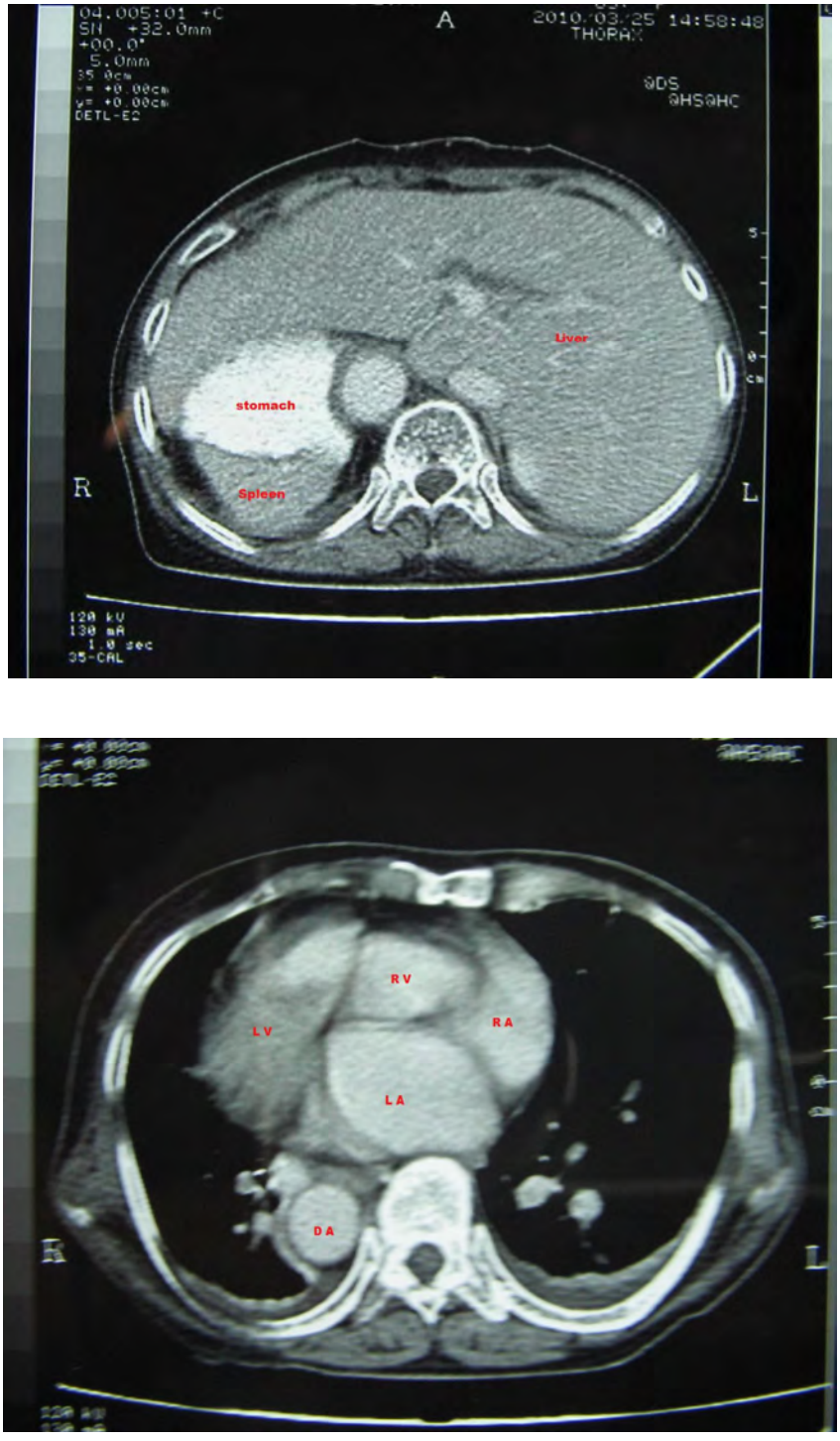


Fig 4: CT Thorax showing dextrocardia

The ECG showed inverted P in lead 1 with deep QS waves and inverted T waves in precordial leads V2 to V6 (figure 2). The CT thorax showed dextrocardia with reversal of normal cardiac anatomy (figure 4). Abdominal CT revealed liver, gall bladder and portal system to be present on the left side while spleen and stomach were present on the right side (figure 5).

Echocardiography revealed no anomaly except dextrocardia. A diagnosis of situs inversus totalis was confirmed.

General anesthesia was planned for the epigastric hernial swelling. The patient was premedicated with inj. Midazolam 2mg and 0.2mg glycopyrrolate IM ½ hr before shifting to the OT. An 18G IV cannula was put in right forearm and ECG leads were placed on right side of thorax in same manner as is put on left side. Rest of the monitoring devices were SpO2, NIBP and EtCO2. After 3 minutes of preoxygenation she was induced with 250 mg of thiopentone sodium, fentanyl 100 µg and 50 mg Rocuronium and was intubated with 7.5 mm cuffed endotracheal tube. She was put on controlled ventilation (Aestiva 5 Datex Ohmeda) and maintained with 0.4% isoflurane, 50 : 50 N2O : O2 and rocuronium top ups. The surgery lasted for 45 minutes after which the patient was reversed with 2.5 mg neostigmine and 0.4 mg glycopyrrolate, and then extubated on table. Her pulse rate, blood pressure, SpO2 and EtCO2 remained stable throughout the procedure and also post extubation. She was given 2000 ml of Ringer lactate intraoperatively. She received inj. Fentanyl for post operative analgesia.

The patient had an uneventful post operative recovery and was discharged on seventh day after surgery.

**Discussion**

Our patient presented with a rare anomaly of situs inversus totalis. As the patient had no previous medical evaluation the incidental finding of dextrocardia lead us to a thorough investigational work up. Such patients remain asymptomatic with a normal life span. As the site of surgery was in the epigastric region general anesthesia was planned. A search through the literature revealed that such patients may have various cardiac defects which in our case was ruled out by an echocardiography . There may be associated cilliary dysfunction manifesting as kartagener syndrome (triad of sinusitis, bronchiectasis and situs inversus). Our patient had no features suggestive of any chest or nasal sinus infection.

As there has been one case reported of prolonged apnea after giving succinylcholine[4] we used rocuronium instead for intubation.

The anesthetist must be aware of the intermediate phenotype called situs ambiguous or heterotaxia[5] . The ambiguous types may be polysplenia or asplenic syndromes depending on left isomerism (B/L left sidedness) or right isomerism (B/L right sidedness).

Spinal cord malformations like split cord, spina bifida, meningomylocoele and tethered

spinal cord have been associated with situs inversus [6] .

Airway and craniofacial malformations like goldenhar syndrome[7] , aglossia[8] , hypoglossia[9] , cranial diaphysial dysplasia[10] were also found to be associated with situs inversus.

Patients coming up for surgeries must undergo thorough evaluation (physical and investigations) to identify situs inversus totalis and associated anomalies preoperatively to prevent any surgical or anesthetic mishap.

**Conclusion**

We describe a case of situs inversus totalis with epigastric hernia who was operated under general anesthesia uneventfully. The detailed description of the anomaly and its various associations have been listed to help in the perioperative care of such rare anomalies.

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# ABSTRACTS FROM LITERATURE

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## The early and delayed analgesic effects of ketamine after total hip arthroplasty: a prospective, randomized, controlled double-blind study.

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BACKGROUND: Ketamine has been shown to have a morphine-sparing effect soon after surgery. Nevertheless, whether this effect still exists after being combined with nonsteroidal antiinflammatory drugs and acetaminophen, and whether ketamine can decrease chronic pain after nononcologic surgery remain unclear. Thus, we designed a study to assess ketamine's effect on acute and chronic postoperative pain when combined with multimodal analgesia after total hip arthroplasty (THA). METHODS: Patients scheduled for primary nononcologic THA using standardized general anesthesia were randomized. They received IV ketamine before incision (0.5 mg/kg), and a 24-h infusion (2 microg x kg(-1) x min(-1)) or a similar blinded saline bolus and infusion. Postoperative analgesia included IV acetaminophen, ketoprofen, plus morphine/droperidol patient-controlled analgesia for 48 h. Data pertaining to pain scores, morphine consumption, and need for crutches were collected for 6 mo after THA. Our primary outcome was 24-h morphine consumption. RESULTS: One hundred fifty-four patients were included (placebo, 75; ketamine, 79). Patients and operative data were similar in both groups. Ketamine decreased morphine consumption at 24 h from 19 +/- 12 mg to 14 +/- 13 mg (P = 0.004). At Day 30, ketamine decreased the proportion of patients needing 2 crutches or a walking frame from 56% to 31% (P = 0.0035). From Day 30 to Day 180, ketamine decreased the proportion of patients with persistent pain at rest in the operated hip (P = 0.008). At Day 180, 21% of placebo group patients (15 of 70) experienced pain at rest in the operated hip versus 8% (6 of 72) in the ketamine group (P = 0.036, odds ratio 0.33, 95% confidence interval 0.12-0.91, risk reduction 67%). CONCLUSIONS: Ketamine had a morphine-sparing effect after THA, even when morphine was combined with multimodal systemic analgesia. It also facilitated rehabilitation at 1 month and decreased postoperative chronic pain up to 6 month after surgery.

# ABSTRACTS FROM LITERATURE

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## Glucose as a marker of fluid absorption in bipolar transurethral surgery.

Anesth Analg. 2009 Dec; 109(6):1850-5.

Piros D, Fagerström T, Collins JW, Hahn RG.

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BACKGROUND: Historically, a reduced serum sodium concentration has been used to diagnose absorption of electrolyte-free irrigating fluid during transurethral resection of the prostate (TURP). In bipolar TURP, the irrigating solution contains electrolytes, thus invalidating the serum sodium method. In this study, we investigated whether glucose can be used to diagnose the absorption of irrigating fluid during TURP procedures. METHODS: The serum glucose and sodium concentrations were measured in 250 patients undergoing monopolar TURP using either 1.5% glycine or 5% glucose for urinary bladder irrigation. The glucose kinetics was analyzed in 10 volunteers receiving a 30-min infusion of 20 mL/kg of acetated Ringer's solution with 1% glucose. These data were then used in computer simulations of different absorption patterns that were summarized in a nomogram for the relationship between the glucose level and administered fluid volume. RESULTS: There was a statistically significant inverse linear relationship between the decrease in serum sodium and the increase in glucose levels after absorption of 5% glucose during TURP (r(2) = 0.80). The glucose concentration increased, from 4.6 (sd 0.4) to 8.3 (0.9) mmol/L, during the experimental infusions. Regardless of the absorption pattern, all simulations indicated that the uptake of 1 L of fluid containing 1% glucose corresponded to an increase in the glucose level of 3.7 (sd 1.6) mmol/L at the end of surgery, whereas 2 L yielded an increase of 6.9 (1.7) mmol/L. CONCLUSIONS: In bipolar TURP, the addition of glucose to a concentration of 1% in the electrolyte-containing irrigation fluid can be used as a tracer of absorption that is comparable with measuring serum sodium after monopolar TURP.

# ABSTRACTS FROM LITERATURE

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## Preoperative dexamethasone enhances quality of recovery after laparoscopic cholecystectomy: effect on in-hospital and postdischarge recovery outcomes.

Anesthesiology. 2011 Apr;114(4):882-90
Murphy GS, Szokol JW, Greenberg SB, Avram MJ, Vender JS, Nisman M, Vaughn J.
Department of Anesthesiology, NorthShore University HealthSystem, 2650 Ridge Avenue, Evanston, Illinois 60201, USA. dgmurphy2@yahoo.com

BACKGROUND: The effect of dexamethasone on quality of recovery after discharge from the hospital after laparoscopic surgery has not been examined rigorously in previous investigations. We hypothesized that preoperative dexamethasone would enhance patient-perceived quality of recovery on postoperative day 1 in subjects undergoing laparoscopic cholecystectomy. METHODS: One hundred twenty patients undergoing outpatient laparoscopic cholecystectomy were randomized to receive either dexamethasone (8 mg) or placebo-saline. A 40-item quality-of-recovery scoring system (QoR-40) was administered preoperatively and on postoperative day 1 to all subjects. Nausea, vomiting, fatigue, and pain scores were recorded at the time of discharge from the postanesthesia care unit and ambulatory surgical unit. Hospital length of stay was also assessed. RESULTS: Global QoR-40 scores on postoperative day 1 were higher in the dexamethasone group (median [range], 178 [130-195]) compared with the control group (161 [113-194]) (median difference [99% CI], -18 [-26 to -8]; P < 0.0001). Postoperative QoR-40 scores in the dimensions of emotional state, physical comfort, and pain were all improved in the dexamethasone group compared with the control group (P < 0.001). Nausea, fatigue, and pain scores were all reduced in the dexamethasone group during the hospitalization, as were postoperative analgesic requirements (P < 0.05). Total hospital length of stay was also reduced in subjects administered steroids (P = 0.003).CONCLUSIONS: Among patients undergoing outpatient laparoscopic cholecystectomy surgery, the use of preoperative dexamethasone enhanced postdischarge quality of recovery and reduced nausea, pain, and fatigue in the early postoperative period.

# ABSTRACTS FROM LITERATURE

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## The 90° rotation technique improves the ease of insertion of the ProSeal™ laryngeal mask airway in children.

Can J Anaesth. 2011 Apr;58(4):379-83. Epub 2011 Jan 4.
Yun MJ, Hwang JW, Park SH, Han SH, Park HP, Kim JH, Jeon YT, Lee SC.
Department of Anesthesiology and Pain Medicine, National Medical Center, Seoul, South Korea.

BACKGROUND: A previous study using a 180° rotation to insert the ProSeal™ laryngeal mask airway (LMA ProSeal) in children did not show improvement over the standard technique. We used a 90° rotation technique to insert the LMA ProSeal in pediatric patients and compared ease of insertion and pharyngeal trauma with the standard technique. METHODS: This prospective randomized controlled study included 126 patients aged three to nine years. Anesthesia was induced with thiopental and rocuronium, and the LMA ProSeal used in the study ranged in size from 2 to 3 depending on the patient's body weight. In the control group (n = 63), the LMA ProSeal was inserted using the index finger. In the rotation group (n = 63), the entire cuff of the LMA ProSeal was placed in the patient's mouth without finger insertion and rotated 90° counter clockwise around the tongue. The LMA ProSeal was then advanced and rotated back until resistance was felt. The primary outcome was the insertion success rate at first attempt. RESULTS: The success rate of insertion at first attempt was higher with the rotation technique than with the standard technique (97% vs 70%, respectively; P < 0.001) and the insertion time was shorter (16 ± 6 sec vs 30 ± 24 sec, respectively; P < 0.001). Mean blood pressure after LMA ProSeal insertion increased significantly in the control group (62 ± 12 to 69 ± 17 mmHg; P = 0.01), but not in the rotation group. The incidence of blood staining was lower in the rotation group than in the control group (10% vs 25%, respectively; P = 0.03), but the incidence of sore throat was not significantly different (24% vs 22%, respectively; P = 0.9). CONCLUSIONS: The 90° rotation technique improves ease of insertion of the LMA ProSeal in children, and it decreases the risk of pharyngeal trauma. (ClinicalTrials.gov number, NCT01076725).

# ABSTRACTS FROM LITERATURE

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## Chest-compression-only versus standard cardiopulmonary resuscitation: a meta-analysis.

Lancet. 2010 Nov 6;376(9752):1552-7. Epub 2010 Oct 14.
Hüpfl M, Selig HF, Nagele P.
Department of Anesthesiology, Critical Care and Pain Therapy, Medical University of Vienna, Vienna, Austria.

BACKGROUND: In out-of-hospital cardiac arrest, dispatcher-assisted chest-compression-only bystander CPR might be superior to standard bystander CPR (chest compression plus rescue ventilation), but trial findings have not shown significantly improved outcomes. We aimed to establish the association of chest-compression-only CPR with survival in patients with out-of-hospital cardiac arrest. METHODS: Medline and Embase were systematically reviewed for studies published between January, 1985, and August, 2010, in which chest-compression-only bystander CPR was compared with standard bystander CPR for adult patients with out-of-hospital cardiac arrest. In the primary meta-analysis, we included trials in which patients were randomly allocated to receive one of the two CPR techniques, according to dispatcher instructions; and in the secondary meta-analysis, we included observational cohort studies of chest-compression-only CPR. All studies had to supply survival data. The primary outcome was survival to hospital discharge. A fixed-effects model was used for both meta-analyses because of an absence of heterogeneity among the studies (I(2)=0%). FINDINGS: In the primary meta-analysis, pooled data from three randomised trials showed that chest-compression-only CPR was associated with improved chance of survival compared with standard CPR (14% [211/1500] vs 12% [178/1531]; risk ratio 1•22, 95% CI 1•01-1•46). The absolute increase in survival was 2•4% (95% CI 0•1-4•9), and the number needed to treat was 41 (95% CI 20-1250). In the secondary meta-analysis of seven observational cohort studies, no difference was recorded between the two CPR techniques (8% [223/2731] vs 8% [863/11 152]; risk ratio 0•96, 95% CI 0•83-1•11). INTERPRETATION: For adults with out-of-hospital cardiac arrest, instructions to bystanders from emergency medical services dispatch should focus on chest-compression-only CPR.

# ABSTRACTS FROM LITERATURE

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## Brief review: Airway rescue with insertion of laryngeal mask airway devices with patients in the prone position.

Can J Anaesth. 2010 Nov;57(11):1014-20. Epub 2010 Sep 2.
Abrishami A, Zilberman P, Chung F.
Department of Anesthesia, Toronto Western Hospital, University Health Network, University of Toronto, Toronto, ON M5T 2S8, Canada.

PURPOSE: Unintentional extubation of the trachea while the anesthetized patient is in the prone position is a potentially life-threatening situation that is usually managed by turning the patient supine for emergent re-intubation. However, this approach may delay definitive airway management and lead to irreversible complications. This review evaluates the efficacy of insertion of a laryngeal mask airway device (LMAD) with the patient in the prone position as a rescue method in airway management for unintentional tracheal extubation. PRINCIPAL FINDINGS: We searched MEDLINE and EMBASE databases in the English language for the period 1980 to October 2009 in order to identify observational studies and case reports describing insertion of the LMAD with the patient in the prone position. We found 12 such articles (n = 526 patients) consisting of four retrospective studies, one prospective cohort with a control group, one non-controlled prospective study, and six case reports. On the first attempt, the LMAD was inserted successfully in 87.5-100% of the patients involved in the included reports. On the second attempt, the LMAD was inserted successfully in all patients, with or without laryngoscopy. Ventilation was maintained successfully in the lungs of 83.3-100% of the patients involved in the reported articles. Following insertion of the LMAD with patients in the prone position, the most common complications reported were sore throat, bleeding, bradycardia, and laryngospasm. CONCLUSIONS: Cumulative experience from published reports suggests the feasibility of placing the LMAD with the patient in the prone position in the elective setting; however, the evidence is lacking regarding the use of this method for emergency management of unintended tracheal extubation with the patient in the prone position.

# ABSTRACTS FROM LITERATURE

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## Tranexamic Acid Reduces Blood Loss After Off-Pump Coronary Surgery: A Prospective, Randomized, Double-Blind, Placebo-Controlled Study.

Anesth Analg. 2011 Jul 7. [Epub ahead of print]
Wang G, Xie G, Jiang T, Wang Y, Wang W, Ji H, Liu M, Chen L, Li L.
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Background: Bleeding and the need for allogeneic transfusions are still problems after off-pump coronary artery bypass grafting (OPCAB) surgery. We therefore evaluated the effects of an antifibrinolytic, tranexamic acid, on postoperative bleeding and transfusion requirements in patients undergoing OPCAB surgery. Methods: Two hundred thirty-one consecutive patients scheduled for elective OPCAB were enrolled in the study. Using a double-blind method, the patients were randomly assigned to receive either tranexamic acid (bolus 1 g before surgical incision followed by an infusion of 400 mg/h during surgery; n = 116) or a placebo (infusion equivalent volume of saline solution; n = 115). The primary outcome was 24-hour postoperative chest tube drainage. Allogeneic transfusion, mortality, major morbidities, and resource utilization were also recorded. Results: In comparison with the placebo group, the patients receiving tranexamic acid had a significant reduction in chest tube drainage at 6 hours (270 ± 118 mL vs 416 ± 179 mL, P < 0.001) and 24 hours (654 ± 224 mL vs 891 ± 295 mL, P < 0.001). There was also a significant reduction in allogeneic red blood cell transfusions (47% vs 31.9%, P = 0.019) and fresh frozen plasma (29.6% vs 17.2%, P = 0.027) transfusions. There were no differences in mortality, morbidity, and resource utilization between the 2 groups. Conclusions: Tranexamic acid reduces postoperative chest tube drainage and the requirement for allogeneic transfusion in off-pump coronary surgery.

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## Brief report: the effect of suggestion on unpleasant dreams induced by ketamine administration.

Anesth Analg. 2011 May;112(5):1082-5. Epub 2011 Feb 23.
Cheong SH, Lee KM, Lim SH, Cho KR, Kim MH, Ko MJ, Shim JC, Oh MK, Kim YH, Lee SE.
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The use of ketamine may be associated with the recall of unpleasant dreams after sedation. We hypothesized that a positive suggestion before sedation could reduce the incidence of ketamine-induced unpleasant dreams. To test this hypothesis, we randomized 100 patients receiving sedation with ketamine for their procedure into 2 groups with 1 group having an anesthesiologist provide a mood-elevating suggestion to the patient before ketamine administration (suggestion group), whereas in the control group no suggestion was provided. Patients were provided with a pleasantness/unpleasantness scale to rate "the overall mood of the dream" as very unpleasant (grade 1), quite unpleasant (grade 2), neither or mixed (grade 3), quite pleasant (grade 4), and very pleasant (grade 5). In those patients who lost consciousness, the frequencies of grades 1, 2, 3, 4, and 5 were 0%, 0%, 46%, 24%, and 30% in the suggestion group and were 6%, 2%, 70%, 12%, and 10%, respectively, in the control group (P=0.01). In the intent-to-treat population the overall frequency between groups was very similar. This study implies that when administering ketamine as part of a sedation regimen, positive suggestion may help reduce the recall of unpleasant dreaming.

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## Noninvasive ventilation and alveolar recruitment maneuver improve respiratory function during and after intubation of morbidly obese patients: a randomized controlled study.

Anesthesiology. 2011 Jun;114(6):1354-63.
Futier E, Constantin JM, Pelosi P, Chanques G, Massone A, Petit A, Kwiatkowski F, Bazin JE, Jaber S.
Department of Anesthesiology and Critical Care Medicine, Estaing Hospital, University Hospital of Clermont-Ferrand, Clermont-Ferrand, France. efutier@chu-clermontferrand.fr

BACKGROUND: Morbid obesity predisposes patients to lung collapse and hypoxemia during induction of anesthesia. The aim of this prospective study was to determine whether noninvasive positive pressure ventilation (NPPV) improves arterial oxygenation and end-expiratory lung volume (EELV) compared with conventional preoxygenation, and whether NPPV followed by early recruitment maneuver (RM) after endotracheal intubation (ETI) further improves oxygenation and respiratory function compared with NPPV alone.METHODS: Sixty-six consecutive patients (body mass index, 46 ± 6 kg/m²) were randomized to receive 5 min of either conventional preoxygenation with spontaneous breathing of 100% $O_2$ (CON), NPPV (pressure support and positive end-expiratory pressure), or NPPV followed by RM (NPPV+RM). Gas exchange was measured in awake patients, at the end of preoxygenation, immediately after ETI, and 5 min after the onset of mechanical ventilation. EELV was measured immediately after ETI and 5 min after mechanical ventilation. The primary endpoint was arterial oxygenation 5 min after the onset of mechanical ventilation. Results are presented as mean ± SD. RESULTS: At the end of preoxygenation, $Pao_2$ was higher in the NPPV and NPPV+RM groups (382 ± 87 mmHg and 375 ± 82 mmHg, respectively; both $P < 0.001$) compared with the CON group (306 ± 51 mmHg) and remained higher after ETI (225 ± 104 mmHg and 221 ± 110 mmHg, in the NPPV and NPPV+RM groups, respectively; both $P < 0.01$ compared with the CON group [150 ± 50 mmHg]). After the onset of mechanical ventilation, $Pao_2$ was 93 ± 25 mmHg in the CON group, 128 ± 54 mmHg in the NPPV group ($P = 0.035$ vs. CON group), and 234 ± 73 mmHg in the NPPV+RM group ($P < 0.0001$ vs. NPPV group). After ETI, EELV was higher in the NPPV group compared with the CON group ($P < 0.001$). Compared with NPPV alone, RM further improved gas exchange and EELV (all $P < 0.05$). A significant correlation was found between Pao2 obtained 5 min after mechanical ventilation and EELV ($R = 0.41$, $P < 0.001$).CONCLUSION: NPPV improves oxygenation and EELV in morbidly obese patients compared with conventional preoxygenation. NPPV combined with early RM is more effective than NPPV alone at improving respiratory function after ETI.

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## Comparative evaluation of atenolol and clonidine premedication on cardiovascular response to nasal speculum insertion during trans-sphenoid surgery for resection of pituitary adenoma: A prospective, randomised, double-blind, controlled study.

Indian J Anaesth. 2011 Mar;55(2):135-40.
Gupta D, Srivastava S, Dubey RK, Prakash PS, Singh PK, Singh U.
Department of Anaesthesiology, Sanjay Gandhi Post Graduate Institute of Medical Sciences, Lucknow, India.
Severe cardiovascular responses in the form of tachycardia and hypertension following nasal speculum insertion occur during sublabial rhinoseptal trans-sphenoid approach for resection of small pituitary tumours. We compare the effects of preoperative administration of clonidine (α-2 agonist) and atenolol (α-blocker) over haemodynamic response, caused by speculum insertion during trans-sphenoid pituitary resection. We enrolled 66 patients in age range 18-65 years, of ASA I-II, and of either sex undergoing elective sublabial rhinoseptal trans-sphenoidal hypophysectomy. Group I (control) received placebo, group II (clonidine) received tablet clonidine 5 μg/kg, and group III (atenolol) received tablet atenolol 0.5 mg/kg. The heart rate increased on speculum insertion and 5 and 10 minutes following speculum insertion as compared to the pre-speculum values in the control group, while no change in the heart rate was observed in other groups ($P<0.05$). There was a rise in the mean arterial pressure during and 5, 10, and 15 minutes after nasal speculum insertion in the control group, whereas it was not seen in other groups ($P<0.05$). We therefore suggest that oral clonidine and oral atenolol (given 2 hours prior to surgery) is an equally effective and safe method of attenuating haemodynamic response caused by nasal speculum insertion during trans-sphenoid pituitary resection.

# ABSTRACTS FROM LITERATURE

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## A comparison of the effect of aprotinin and ε-aminocaproic acid on renal function in children undergoing cardiac surgery.

J Cardiothorac Vasc Anesth. 2011 Jun;25(3):402-6. Epub 2011 Mar 17.
Leyvi G, Nelson O, Yedlin A, Pasamba M, Belamarich PF, Nair S, Cohen HW.
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OBJECTIVE: To assess the incidence of renal injury among pediatric patients who received aprotinin while undergoing cardiac surgery compared with those who received ε-aminocaproic acid (EACA).DESIGN: A retrospective observational study. SETTING: A single academic center.PARTICIPANTS: Pediatric cardiac patients who had cardiopulmonary bypass and received aprotinin or EACA.INTERVENTION: Patients undergoing pediatric cardiac surgery received aprotinin from 2005 to 2007 and EACA from 2008 to 2009. MEASUREMENTS AND MAIN RESULTS: The primary outcome was acute kidney injury (AKI) defined as serum Cr elevation at discharge more than 1.5 times the baseline value. Secondary outcomes included bleeding, blood transfusion, and the volume of chest tube drainage in the first 24 hours postoperatively. One hundred seventy-eight patients met inclusion criteria; 120 patients received aprotinin, and 58 patients received EACA. These 2 groups did not differ significantly in age, weight, or duration of cardiac bypass. Logistic regression analysis, adjusted for confounding variables (ie, baseline Cr, sex, age, CPB time, inotropic support and vasopressors), showed a higher odds of suffering AKI at discharge with the usage of aprotinin (odds ratio = 4.7; 95% confidence interval, 1.1-19.5; p = 0.03). The volume of the first 24 hours of chest tube drainage was not significantly different between groups, as well as packed red blood cells and cryoprecipitate units. However, fresh frozen plasma and platelets showed statistically significant differences with more transfusion in the EACA group.CONCLUSION: In this retrospective study, the authors observed a higher odds of AKI for aprotinin usage compared with EACA, suggesting that the known concern for adults with adverse kidney effects with aprotinin is also appropriate for pediatric patients.

# ABSTRACTS FROM LITERATURE

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## Efficacy of Prophylactic Low Dose of Tranexamic Acid in Spinal Fixation Surgery: A Randomized Clinical Trial.

2011 Aug 10. [Epub ahead of print]
Farrokhi MR, Kazemi AP, Jahromi HR, Akbari K.
*Shiraz Neurosciences Research Center †Anesthesiology Department, Shiraz University of Medical Sciences, Shiraz, Iran.
BACKGROUND: Spinal fixation surgery is potentially associated with significant bleeding, often requiring multiple blood transfusions. Concern for the risks of transfusion-acquired infection and immune modulation effects of allogeneic blood has led to the investigation of various hemostatic agents such as tranexamic acid (TXA). The investigators hypothesized that a prophylactic low dose of TXA would reduce blood loss and transfusion requirements during spinal fixation surgery. METHODS: : Of 92 patients, 76 were eligible for participation: 38 patients underwent TXA (10 mg/kg) at the initiation of induction of anesthesia during 10 min followed by intravenous infusion of 1 mg/kg/h (TXA group) and 38 patients received normal saline (control group). General anesthesia was administered and different hemodynamic parameters, complete blood count, abnormal prothrombin time, partial thromboplastin time, fibrinogen level, electrolytes, blood loss, and complications were assessed. RESULTS: Amount of blood transfused to the TXA group (n=10; 675±382 mL) compared with the control group (n=15; 600±220 mL) was not statistically significant (P=0.539). Total intraoperative blood loss was not significantly reduced in the TXA group compared with the control group (1269±690 vs. 1336±550 mL; P=0.659). In the 2 groups, fibrinogen level changed to the same extent and platelet count was reduced. Trend of changes in sodium, potassium, and calcium was the same in either group. No thromboembolic complications were clinically detected in either group. CONCLUSIONS: The administration of a prophylactic low dose of TXA did not have a significant effect in the management of intraoperative blood loss and transfusion requirements in patients undergoing spinal fixation surgery.

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## Comparative evaluation of oxygen-ozone therapy and combined use of oxygen-ozone therapy with percutaneous intradiscal radiofrequency thermocoagulation for the treatment of lumbar disc herniation.

Pain Pract. 2011 Mar;11(2):160-6.
Gautam S, Rastogi V, Jain A, Singh AP.
Department of Anesthesiology, Institute of Medical Sciences, Banaras Hindu University, Varanasi, India. docsksg@gmail.com
AIM: To compare the efficacy of oxygen-ozone therapy and the combined use of oxygen-ozone therapy with percutaneous intradiscal radiofrequency thermocoagulation (PIRFT) for the treatment of contained lumbar disc herniation. METHODS: Ninety-one adult patients with low back pain secondary to contained lumbar disc herniation were randomly assigned into two groups. Ozone group received intradiscal oxygen-ozone therapy (4 to 7 mL of oxygen ozone mixture); ozone-PIRFT group received a combination of oxygen-ozone therapy with PIRFT (radiofrequency lesioning at 80°C for 360 s). OUTCOME MEASURES: Primary outcome measures included a visual analog scale (VAS) for pain and the Oswestry disability index (ODI). Secondary outcome measures included pain relief, reduction of analgesic consumption, and patient's satisfaction. Clinical assessment of these outcome measures was performed at 2 weeks, 1 month, 3 months, 6 months, and 1 year after the procedure. RESULTS: VAS scores and ODI were significantly decreased by both ozone and ozone-PIRFT when compared with the baseline values at all points of follow-up; however, ozone-PIRFT produced a significant reduction in the VAS scores and ODI when compared to ozone at 2 weeks, 1 month, 3 months, 6 months, and 1 year follow-up. Ozone-PIRFT also resulted in a significant change in all secondary measures at all points of follow-up, as compared with the ozone group. CONCLUSION: Ozone-PIRFT is more efficacious than ozone alone in reducing pain scores, analgesic consumption, improving functional outcome, and satisfaction of patients with contained lumbar disc herniation.

# ABSTRACTS FROM LITERATURE

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## High Oxygen Partial Pressure Decreases Anemia-induced Heart Rate Increase Equivalent to Transfusion.

Anesthesiology. 2011 Jul 15. [Epub ahead of print]
Feiner JR, Finlay-Morreale HE, Toy P, Lieberman JA, Viele MK, Hopf HW, Weiskopf RB.
Department of Anesthesia and Perioperative Care, University of California, San Francisco.
BACKGROUND: Anemia is associated with morbidity and mortality and frequently leads to transfusion of erythrocytes. The authors sought to directly compare the effect of high inspired oxygen fraction versus transfusion of erythrocytes on the anemia-induced increased heart rate (HR) in humans undergoing experimental acute isovolemic anemia. METHODS: The authors combined HR data from healthy subjects undergoing experimental isovolemic anemia in seven studies performed by the group. HR changes associated with breathing 100% oxygen by nonrebreathing facemask versus transfusion of erythrocytes at their nadir hemoglobin concentration of 5 g/dl were examined. Data were analyzed using a mixed-effects model. RESULTS: HR had an inverse linear relationship to hemoglobin concentration with a mean increase of 3.9 beats per min per gram of hemoglobin (beats/min/g hemoglobin) decrease (95% CI, 3.7-4.1 beats/min/g hemoglobin), P < 0.0001. Return of autologous erythrocytes significantly decreased HR by 5.3 beats/min/g hemoglobin (95% CI, 3.8-6.8 beats/min/g hemoglobin) increase, P < 0.0001. HR at nadir hemoglobin of 5.6 g/dl (95% CI, 5.5-5.7 g/dl) when breathing air (91.4 beats/min; 95% CI, 87.6-95.2 beats/min) was reduced by breathing 100% oxygen (83.0 beats/min; 95% CI, 79.0-87.0 beats/min), P < 0.0001. The HR at hemoglobin 5.6 g/dl when breathing oxygen was equivalent to the HR at hemoglobin 8.9 g/dl when breathing air. CONCLUSIONS: High arterial oxygen partial pressure reverses the heart rate response to anemia, probably because of its usability rather than its effect on total oxygen content. The benefit of high arterial oxygen partial pressure has significant potential clinical implications for the acute treatment of anemia and results of transfusion trials.

# ABSTRACTS FROM LITERATURE

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## Perioperative Single Dose Systemic Dexamethasone for Postoperative Pain: A Meta-analysis of Randomized Controlled Trials.

Anesthesiology. 2011 Jul 27. [Epub ahead of print]
De Oliveira GS Jr, Almeida MD, Benzon HT, McCarthy RJ.
Department of Anesthesiology, Northwestern University, Feinberg School of Medicine, Chicago, Illinois.
BACKGROUND: Dexamethasone is frequently administered in the perioperative period to reduce postoperative nausea and vomiting. In contrast, the analgesic effects of dexamethasone are not well defined. The authors performed a meta-analysis to evaluate the dose-dependent analgesic effects of perioperative dexamethasone. METHODS: We followed the PRISMA statement guidelines. A wide search was performed to identify randomized controlled trials that evaluated the effects of a single dose systemic dexamethasone on postoperative pain and opioid consumption. Meta-analysis was performed using a random-effect model. Effects of dexamethasone dose were evaluated by pooling studies into three dosage groups: low (less than 0.1 mg/kg), intermediate (0.11-0.2 mg/kg) and high (≥0.21 mg/kg). RESULTS: Twenty-four randomized clinical trials with 2,751 subjects were included. The mean (95% CI) combined effects favored dexamethasone over placebo for pain at rest (≤4 h, -0.32 [0.47 to -0.18], 24 h, -0.49 [-0.67 to -0.31]) and with movement (≤ 4 h, -0.64 [-0.86 to -0.41], 24 h, -0.47 [-0.71 to -0.24]). Opioid consumption was decreased to a similar extent with moderate -0.82 (-1.30 to -0.42) and high -0.85 (-1.24 to -0.46) dexamethasone, but not decreased with low-dose dexamethasone -0.18 (-0.39-0.03). No increase in analgesic effectiveness or reduction in opioid use could be demonstrated between the high- and intermediate-dose dexamethasone. Preoperative administration of dexamethasone appears to produce a more consistent analgesic effect compared with intraoperative administration. CONCLUSION: Dexamethasone at doses more than 0.1 mg/kg is an effective adjunct in multimodal strategies to reduce postoperative pain and opioid consumption after surgery. The preoperative administration of the drug produces less variation of effects on pain outcomes.

# ABSTRACTS FROM LITERATURE

**Compiled by:**
**DR DEVENDRA GUPTA** M.D, P.D.C.C (Neuroanesthesia)
Assistant professor, Department of Anaesthesiology, SGPGIMS, Lucknow (dgupta@sgpgi.ac.in)

## Patient-controlled sedation: a novel approach to sedation management for mechanically ventilated patients.

2010 Nov;138(5):1045-53. Epub 2010 Mar 18.
Chlan LL, Weinert CR, Skaar DJ, Tracy MF.
School of Nursing, University of Minnesota, 5-160 Weaver-Densford Hall, 308 Harvard St SE, Minneapolis, MN 55455, USA. chlan001@umn.edu
BACKGROUND: Patient self-administration of medications for analgesia and procedural sedation is common. However, it is not known whether mechanically ventilated ICU patients can self-administer their own sedation to manage symptoms. METHODS: This descriptive pilot study examined the safety, adequacy, and satisfaction of patient-controlled sedation (PCS) with a convenience sample of critically ill, mechanically ventilated patients (N = 17) in the ICUs at University of Minnesota Medical Center, Fairview, Minneapolis, Minnesota. Dexmedetomidine was administered via a patient-demand infusion pump system for a maximum of 24 h. Pumps were programmed with basal infusion plus patient-triggered boluses; nurses adjusted the basal infusion based on a dosing algorithm. Data were collected on sedation adequacy, additional dosing of analgesics and sedatives, hemodynamic parameters, safety of PCS, patient satisfaction with PCS, and nurse satisfaction with PCS. RESULTS: Although a majority of the hemodynamic values were within the established safety parameters for the study, 25% of patients experienced mild adverse physiologic effects. Furthermore, despite patients' perception of sedation adequacy with PCS, 70% received supplemental opiates or benzodiazepine medications while participating in the study. Patients rated dexmedetomidine PCS favorably for self-management of anxiety, level of relaxation obtained, and comfort in self-administering sedation. Nurses also were generally satisfied with PCS as a method of sedation, dexmedetomidine as the sedative, and patient response to the sedation. CONCLUSIONS: PCS warrants further investigation as a means to promote comfort in mechanically ventilated critically ill patients.

# ABSTRACTS FROM LITERATURE

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Assistant professor, Department of Anaesthesiology, SGPGIMS, Lucknow (dgupta@sgpgi.ac.in)

## Does the prophylactic administration of magnesium sulphate to patients undergoing thoracotomy prevent postoperative supraventricular arrhythmias? A randomized controlled trial.

Br J Anaesth. 2011 Jun;106(6):785-91. Epub 2011 May 9.
Saran T, Perkins GD, Javed MA, Annam V, Leong L, Gao F, Stedman R.
Academic Department of Anaesthesia, Critical Care and Pain, Heart of England NHS Foundation Trust, Birmingham B9 5SS, UK. taj.saran@uhcw.nhs.ukBACKGROUND: Supraventricular arrhythmias (SVA) are common after thoracic surgery and are associated with increased morbidity and mortality. This prospective, randomized, double-blind, placebo-controlled trial examined the effects of perioperative magnesium on the development of postoperative SVA. METHODS: Two hundred patients undergoing thoracotomy for lobectomy, bi-lobectomy, pneumonectomy, or oesophagectomy were recruited and randomly allocated into two groups. The treatment group received magnesium (5 g daily) intraoperatively, and on days 1 and 2 after operation, the control group received placebo. The primary outcome of the study was the development of SVA within the first 5 days after operation. RESULTS: There were 100 patients in each arm of the study, with one withdrawal and three lost to follow-up in the treatment group and four withdrawals in the control group. Ninety-six patients received magnesium and 96 received placebo. There was no difference in the incidence of SVA between the treatment and control groups, 16.7% (16/96) vs 25% (24/96), P=0.16. In the predefined subgroup analysis, patients at highest risk of arrhythmias (those undergoing pneumonectomy) had a significant reduction in the frequency of SVA, 11.1% (2/18) vs 52.9% (9/17), P=0.008. There were no differences in hospital length of stay or mortality. Patients receiving i.v. magnesium experienced a higher frequency of minor side-effects (stinging at injection site). The treatment was otherwise well tolerated. CONCLUSIONS: Overall, prophylactic magnesium did not reduce the incidence of SVA in patients undergoing thoracotomy. However, it reduced the incidence of SVA in the high-risk cohort of patients undergoing pneumonectomy.

# ABSTRACTS FROM LITERATURE

**Compiled by:**
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Assistant professor, Department of Anaesthesiology, SGPGIMS, Lucknow (dgupta@sgpgi.ac.in)

## Brief report: intravenous sodium bicarbonate verifies intravenous position of catheters in ventilated patients.

Anesth Analg. 2011 Aug;113(2):279-81. Epub 2011 Jun 3.
Keidan I, Ben-Menachem E, Barzilai A, Nur I, Berkenstadt H.
MBA, Department of Anesthesia and Intensive Care, Sheba Medical Center, Tel Hashomer 52621, Israel. erezben@yahoo.co.
BACKGROUND: Extravasation is the unintentional injection or leakage of fluids into the perivascular or subcutaneous space resulting in potential tissue injury. In this 2-part prospective, controlled study, we assessed the safety of subcutaneously injected sodium bicarbonate in rats first. In the second part, the diagnostic utility of using IV diluted sodium bicarbonate to confirm placement of IV catheters in endotracheally intubated and ventilated rats and patients was tested. Diluted sodium bicarbonate was created using undiluted standard 8.4% (1 mEq/mL) sodium bicarbonate mixed in a 1:1 ratio with sterile water to achieve a final diluted concentration of 4.2% (0.5 mEq/mL). METHODS: Sodium bicarbonate (8.4% and 4.2%) was injected subcutaneously into 10 rats, and skin samples were evaluated. The hemodynamic and ventilatory effects of IV bicarbonate (2 mL/kg) in ventilated rats were measured. Subsequently, in 20 ASA physical status I and II mechanically ventilated patients, the effects of 50 mL of diluted 4.2% sodium bicarbonate or 0.9% normal saline, injected in a randomized order, were analyzed. RESULTS: Part 1: Undiluted (8.4%) subcutaneous sodium bicarbonate resulted in a small area of skin necrosis in 10% of skin samples (3 of 30) taken from rats. Minimal effects (mild scale crust and foci of regenerative epidermis beneath) were detected when a diluted solution was used. In ventilated rats, IV injection of diluted bicarbonate caused a significant increase in end-tidal carbon dioxide, whereas subcutaneous injection had no effect. In humans, diluted bicarbonate resulted in an end-tidal carbon dioxide increase (mean of 38 ± 5 to 45 ± 7 mm Hg) within 7 breaths. Injected normal saline did not result in any changes. Sodium bicarbonate was easily differentiated from normal saline injection by anesthesiologists observing the change in end-tidal carbon dioxide concentrations immediately after injection. CONCLUSION: The injection of diluted sodium bicarbonate (in mechanically ventilated patients) can be used to reliably identify the correct location of an IV catheter by an increase in the exhaled carbon dioxide concentration. Although we found no skin damage with 4.2% (0.5 mEq/mL) sodium bicarbonate, safety and efficacy should be further evaluated in future studies.

# MINUTES OF MIDTERM MEETING

Meeting started with welcome address by the President I.S.A. U.P.State Brig. T.Prabhakar

- G.B. approved the agenda discussed at I.S.A. U.P. & Uttarakhand G.B.M. held at Bareilly
- G.B. approved the proposals of midterm meeting held at Safai in May
- Some of the important decisions passed by the G.B.M.:

- 1.Since Uttarakhand has become a separate state chapter there was a formal separation of U.P.&Uttarakhand state and from now onwards it will be known as I.S.A. U.P.State. Dr. J.P.Sharma requested everyone to have good ties between both states in future also.

- 2. Regarding Venue of State Conference for 2011

  Last year at Bareilly it was decided to have Safai as venue of 2011. However Brig. T.Prabhakar informed that since he has already organized I.S.A. sponsored C.M.E. at Safai and on request of Dr.Pradeep Shahi he is Willing to support the next venue at Jhansi. House supported this with full Majorty.
  This is also to be informed that Jhansi bid for next year Central Zone Conference was accepted in the G.B.M. of Central Zone

- **S**ome decisions for the organizers of future state conference including2011
  1. Minimum amount of Rs.25000 is to be deposited to the state headquarter after completetion of the conference.
  2. Complimentary Registration and Free Accomodation to
     A. Member nominated for Lifetime achievement Award
     B. Member given the Oration Award
     C. President and Gen.Secretary of U.P.State

**3.**It is mandatory to hold a midterm Executive meeting . Local hospitality will be provided by the organizers of the conference to the executive comm.members.

Bareilly City Branch donated a sum of Rs. 35000 to the state account. The cheque was presented by Dr. Navneet Agarwal and Dr. R.K.Bhaskar to the state President Brig.T.Prabhakar

- Regarding Dr.K.Pandey Oration Award:
  From this year onwards oration awardee will be given a gold medal and certificate instead of cash award. This year a medal was given to Dr.H.C.Chandola and last year awrdee Dr. L.D.Mishra

  The decision of next year oration awrd will be taken during Midterm executive meeting

- Regarding Mrs. Susmita Malviya Life Time Acheivement Award
  This awrd will be started from 2011 onwards. Dr. Deepak Malviya
  Deposited Rs. 50000 and will deposit another Rs.50000 in the
  Current year.

  This award will include a Silver plate and Shawl.
  For year 2011 Dr. Deepak Malviya will provide the silver plate and the format for future.

  Criteria for This Award :

  1. Member of I.S.A.
  2. Age should be more than 60 years
     Format given in I.S.A. website will be used for lifetime achievement
     Award .
     City Branches have to send the application forwarded by the president and secretary of respective branchbefore 30th april every year so that
     Decision can be taken during midterm executive meeting during summers.

- President Brig. T.Prabhakar stressed upon that this year we should bid for
  More I.S.A. sponsored c.m.e. in our state. He also stressed upon the importance of awareness programmes , membership drive and importance
  Of family benevolent fund scheme.

- Dr.H.C. Chandola gave an execellent oration

- Meeting ended with vote of thanks by the Gen. Secretary

- For information of all members U.P.State won the Awareness

- Promotion Award as the best state for year 2010.

Please acknowledge this mail for future correspondence
Thanking You
Dr. Virendra Sharma
Gen. Secretary U.P.State
9\562,Indira Nagar (near central academy school)
Lucknow U.P. 226016

# GUIDE TO AUTHORS

Anaesthesia update publishes original work and reviews in the fields of Anaesthesia and Critical Care Medicine. Original work includes clinical or laboratory investigations, and clinical or equipment reports. Reviews include information for Continuing Medical Education (CME) and review articles. The UP Anaesthesia Update also publishes letters to the Editor.

Manuscripts, Manuscripts containing original material are accepted for consideration. Authors planning to submit CME articles should first confirm with the Editorial Office that the subject matter is appropriate.

Manuscripts describing investigations carried out in humans will not be accepted for publication unless the text states that the study was approved by, and carried out according to the instructions of the author's Institutional Human Investigations or Ethics Committee Reports of investigations in animals will not be accepted for publication unless the text states that the study was approved by the author's Institutional] Animal Investigation Committee.

Manuscripts should be prepared and submitted in accord with the "Uniform Requirements for Manuscript! Submitted to Biomedical Journals" reprinted in JAMA 1997; 277: 927-34.

The following guidelines should be referred to in the preparation of manuscripts.

Manuscripts (2 copies) must be typed double-spaced throughout. Each of the following section must begin on separate pages: title page, abstract, text acknowledgements, references.

Each table, complete with title and footnotes should be on a separate page. Columns should be separated by Tabs only; authors should not use table or Spreadsheet formats.

Pages should be numbered consecutively beginning with the title page.

Any non-original material (quotations, tables, or figures) must be accompanied by written permission from the copyright owner /publisher to reproduce the material. Permission must be provided for the print and the electronic versions of the Journal. Photographs of recognizable persons must be accompanied by signed release from the individual depicted or his/her legal guardian authorizing publication for the priI1 and electronic versions or the Journal.

FINAL revised manuscripts must be submitted preferably electronically, whether on computer discs or by E-mail.

When submitting manuscripts, please adhere to the following maximum word and reference counts.

The word count excludes Title Page, Abstract, Figure Legends and References.

| | | |
|---|---|---|
| Reports of Clinical or Laboratory Investigation | 4000 words | 50 references |
| Clinical/Equipment Reports | 2000 words | 25 references |
| Review / CME Articles | 7500 words | 100 references |
| Editorials | 1500 words | 15 references |
| Letters to Editor | 250 words | 5 references |
| Book Reviews | 2500 words | 5 references |

**Title Page:** The full title should be informative and must not exceed 90 characters (excluding spaces). In addition to the full title, provide a short title of no more that 40 characters. List authors names, including first names and Highest academic degree. Indicate Department(s) and Institution (s) in which the work was carried out, and the name and address of the author to whom correspondence should be addressed, including telephone and fax numbers and E-main address. Any grant or other support (or absence thereof), must be acknowledged.

**Illustrations:** Submit four un-mounted glossy prints, or high quality laser prints of each illustration. Minimal size 127 x 173 mm [5" x 7"] and no larger than 203 x 254 mm [8" x 10"], Surfaces should not be damaged by clips, pins or heavy writing on the back. Paste on the back a label giving the author's name, number in order of appearance, and top edge of the print. A legend must accompany each illustration; Legends for several illustrations may be grouped on a single page.

**Abstract:** The second page should contain and abstract of not more than 250 words. Abstracts for Reports of Investigation consist of four paragraphs labeled *Purpose, Methods, Results and Conclusion.* The purpose should be a precise statement of the objective(s) of the study. The Methods should describe study design (randomized, controlled, double-blind etc), setting subjects (including number and selection), intervention and measurements. The main Results should be given including numerical values, variation (e.g., standard deviation, range or confidence intervals) and P values where possible. The Conclusions must be supported by the date.

Abstracts for Clinical Reports should consist of paragraphs labeled *Purpose, Clinical features and conclusion.* For Review articles, the abstract should state the *Purpose source, principal findings and Conclusion.*

**Text:** The text of original articles is usually, but not necessarily, divided into the following sections: *Introduction, Methods, Results, and Discussion.*

**Abbreviations** must be preceded by the full term for which they stand, the first time they appear in the text.

**Units of Measurement:** Units should conform to the System International (S1) Authors may elect to include traditional units, in addition to the 51 units.

**Footnotes:** occurring within text use the sequence a, b, c, etc., with the corresponding footnotes appearing at the bottom of the page.

**Reference:** Number reference consecutively in the order in which they are first mentioned in the text. These should not be done in footnote style. Journal title must be abbreviated according to the style used in Index

Medicus, Unpublished observations, including information from manuscripts submitted for publication but not yet accepted, are not acceptable as references. Articles published without peer review should not be included as reference articles. Abstracts are accepted only if published within the previous five years in peer reviewed journal. Editorials, Abstracts, and Correspondence should be identified as such after the title. Copies of articles "in press" should be provided, together with a copy of the letter of acceptance, at the time of submission. List all authors if six or less; otherwise list first three, then "et al".

For articles accepted for publication authors are asked to provide photocopies of the first page of each reference that they quote together with the revised manuscript.

Examples of Correct Style

1. **JOURNAL ARTICLES**
   Jaeger MJ, Scbultetus RR. The effect of the Bain circuit on gas exchange.
   Can J. Anesth 1987; 34:26-34.

2. **BOOKS AND MONOGRAPHS**
   Greene NM. Key words in Anaesthesiology, 3rd ed.
   New York: Elsevier Science Publishing Company Inc., 1988.

3. **CHAPTER IN A BOOK**
   Maze M, Baden JM, Anesthesia for patients with liver disease. In: Miller RD (Ed.) Anesthesia, 2nd ed. New York: Churchill Livingstone Inc., 1986:1665-80.

For other types of publications consult the "Uniform Requirement" document

Review: Each manuscript received is reviewed by two or more authorities. Authors should receive a report of the review process and be given a decision on publication within eight weeks of receipt of the manuscript.

Proofs and reprints: Page proofs will be sent to the corresponding author and to the Editorial Office for review. If the proofs are not returned by the authors within the time allowed, publication may be delayed.

Submission Letter: A covering letter, signed by all authors, should state that (1) the manuscript has been read and approved by all authors, (2) the material has not been published, in whole or in part, and is not under consideration for publication elsewhere, Sources or financial support (or absence thereof) must be acknowledged.

Where financial arrangements could lead to conflict, they should be disclosed both in the submission letter and on the Title page of the manuscript.

***Manuscripts and other communications should be sent to***:

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