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Anesthesiology

A COMPARATIVE STUDY OF LIGNOCAINE 0.5% AND ROPIVACAINE 0.2% FOR INTRAVENOUS REGIONAL ANESTHESIA FOR UPPER LIMB SURGERY.

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ABSTRACT **Background:** Day care surgeries and ambulatory surgeries have number of advantages for the patient as well as for health care providers and even to hospital staff also. Regional anesthesia has been very popular in day care surgery. Intravenous regional anesthesia is one such simple and reliable technique, with success rates between 94% and 98%.

Objectives: The study aimed to compare intravenous lignocaine 0.5% vs ropivacaine 0.2% in regional anesthesia for elective upper limb surgery.

Material and Methods: Patients included in the study were ASA grade I and II of ages 18-65 years, undergoing elective upper limb surgery. A total of 100 patients were randomly divided into 2 groups. We compared intravenous regional anesthesia by using lignocaine 0.55 with ropivacaine 0.2% for elective upper limb surgery. A detailed history and systemic examination was done to rule out presence of major illness. Routine investigations like haemogram and urine examination was done in all patients.

Results: The difference in mean time of sensory blockade between group L and R was found to be insignificant ($p>0.05$). The difference between mean time of onset of motor blockade between group L and R was found to be significant ($p<0.05$). There was no evidence of side effects after release of tourniquet in 0.2% ropivacaine group as compared to 0.5% lignocaine group. Difference between mean time of recovery from sensory blockade between L and R group was highly significant ($p<0.05$).

Conclusion: From the observations and results of our study we conclude that 0.2% ropivacaine can be used as an alternative to 0.5% lignocaine for intravenous having just the similar onset and intensity of sensory block.

KEYWORDS : Day care surgery, Lingnocaine, Ropivacaine, Intravenous Regional Anaesthesia

INTRODUCTION:

In today's world more than 60% of all elective surgeries are performed in day care surgical settings. Due to the increasing number of rapid diagnostic and surgical treatment centers around the globe reduced the need for hospitalization.[1] Day care surgeries and ambulatory surgeries have number of advantages for the patient as well as for health care providers and even to hospital staff also. These include patient preference mainly children & elderly, lack of dependence on the availability of hospital beds, low morbidity & mortality, lower incidence of infection & respiratory complications, greater efficiency, lower overall procedural costs and less preoperative testing & postoperative medication.[1]

Regional anesthesia has been very popular in day care surgery. Intravenous regional anesthesia is one such simple and reliable technique, with success rates between 94% and 98%.[2] Intravenous regional anesthesia is commonly used for surgeries lasting 60 - 90 minutes of the forearm. Its use for longer surgical procedures is precluded by the appearance of the discomfort from the tourniquet, which limits the indications for its use. The tourniquet produces ischemia, which contributes to the analgesic action of the local anesthetic by blocking nerve conduction and motor endplate function.

Intravenous regional anesthesia offers many advantages including ease of administration, rapid onset, and rapidly of recovery, muscular relaxation and controllable extent of anesthesia.[3] It is a usual technique of anesthesia for outpatient procedures requiring inexpensive equipment, cost effective and widely applicable to patients of different ages & physical status for operations.

It has disadvantages like tourniquet pain, poor post-operative analgesia, limited time of surgical anesthesia, difficulty in providing a bloodless field if exsanguinations are improper, risk of systemic local anesthetic toxicity if tourniquet is accidentally deflated. Rare complications include development of compartment syndrome and loss of limb.

The local anesthetic most often used is lignocaine 0.5%, which has a relatively brief duration of post-operative analgesia after release of tourniquet. A longer acting agent, such as bupivacaine, initially gained substantial popularity for use during intravenous regional anesthesia but it has been associated with potential serious side effects like prolonged ventricular fibrillation which may be irreversible. Intravenous ropivacaine, compared with bupivacaine and lignocaine in several studies has yielded evidence of less cardiac and CNS side effects but has achieved similar surgical anesthetic conditions.

Aim and Objectives:

The study aimed to compare intravenous lignocaine 0.5% vs ropivacaine 0.2% in regional anesthesia for elective upper limb surgery.

MATERIAL AND METHODS:

A comparative study of intravenous regional anaesthesia (IVRA) using lignocaine 0.5% and ropivacaine 0.2% was carried out in 100 patients, undergoing elective upper limb surgery at Department of Anesthesia in a tertiary care teaching hospital, Unnao.

Patients who underwent major surgery during the period year 2018 (Jan-Dec) were taken for the study in the present series. Patients included in the study were ASA grade I and II of ages 18 – 65 years, undergoing elective upper limb surgery. Patients excluded from the study were: Patients with known history of allergy to local anaesthetics and medical conditions where it is not advisable to apply tourniquet. Major systemic diseases where the risk of local anaesthetic toxicity is increased and the dose required needs to be modified. Patients with history of epilepsy. Duration of surgery > 120 minutes. Disease where NSAIDS like diclofenac sodium is contraindicated as it is used for the relief of tourniquet pain in our study. Pregnancy and patients on beta blockers, benzodiazipines and cimetidine as these drugs may modify local anaesthetic toxicity.

Procedure

Patients were randomly divided into 2 equal groups of equal size L and R respectively. Every even number patient received lignocaine and every odd number patient received ropivacaine. Informed consent for the procedure was taken from patients after the approval from the hospital ethical committee. A detailed history and systemic examination was done to rule out presence of major illness. Routine investigations were done in all patients. Total leukocytes count, blood sugar level, kidney function tests , liver function test, electrocardiography and X-ray chest were performed as indicated prior to surgery. The procedure was explained to the patients.

It was confirmed that there is no leak in the tourniquet prior to the procedure. A 20 gauge intravenous catheter was inserted in the opposite hand for crystalloid infusion. A small intravenous catheter (e.g. 22 gauges) was introduced in the dorsum of the patient's hand of the arm to be anaesthetized. The arm to be anaesthetized was elevated for at least 3-5 minutes to allow passive exsanguination, which occurs due to large veins emptying into the more proximal circulation. A pneumatic tourniquet was placed around the upper arm, and the proximal cuff was inflated to 100 mmHg above the systolic blood

pressure. Circulatory isolation of arm was verified by inspection, absence of radial pulse, loss of pulse oximetery reading is ipsilateral index finger.

40 ml of 0.5% lignocaine, which was prepared by adding preservative free 5% lignocaine to 40 ml was used to achieve IVRA and the dose used was 4 mg/kg. Maximum dose was 200 mg or 40 ml of 0.2% of ropivacaine. Dose used was 1.5 mg/kg. Maximum dose used was 80 mg.

Symptoms of local anaesthetic toxicity were treated by increasing the pressure of tourniquet, seizures by inj. Diazepam 0.1mg/kg iv and manual ventilation with 100% oxygen. Hypotension was treated by IV fluids and vasopressors as needed.

Assessment

Pin prick with 22 gauge short beveled needle was used to assess sensory block every 30 sec. Dermatomal senory distribution of medial and lateral brachial cutaneous, ulnar (little finger, hypothenar eminence) median (thenar eminence, index finger) and radial (for arm and first web space) nerves were used to assess patient's response. Patient who received general anesthesia were considered as failure and were not included for the analysis.

Recovery of sensory block was defined as the time elapsed from tourniquet deflation to recovery of sensations in the dermatomes which was determined by pin prick test.The subject was asked to flex and extend his finger, wrist and elbow to assess the motor function.

The time elapased from injection of drug to complete motor block up to 15 minutes was defined as the onset of motor block.

Motor block was graded as followed:

Grade 4 – no movement
Grade 3-movement only at interphalyngeal joint
Grade 2-movemnet at interphalengial and wrist joint
Grade 1- reduced movement at interphalengial, wrist and elbow joint as compared to opposite forearm.

The time elapsed from tourniquet deflation to the movement of finger, hand and forearm comparable to opposite forearm was defined as the recovery of motor block. After sensory and motor block, the distal tourniquet was inflated to 100mmhg above systolic blood pressure, the proximal tourniquet was deflated and the surgery was started.

After the inflation of the distal tourniquet MAP, heart rate and Spo2 were monitored at every 5 minutes during the procedure and post operatively till complete recovery of sensory and motor block. During the procedure, patient was continuously watched for signs of local anaesthetic toxicity and tourniquet pressure on pressure gauge.

Visual analogue scale (0 -No pain 10- worst pain imaginable) was used for the assessment of pain before and after tourniquet application. When VAS was more then 4, injection diclofinac 1.5mg/kg diluted up to 10ml saline given for tourniquet pain.

The tourniquet was not deflated before 25 minute and was not kept inflated for more than 2 hours. At the end of the surgery, the distal tourniquet was deflated by a cyclic inflation deflation technique. Distal tourniquet was deflated for initial 1 minute, then reinflated for 1 minute, and again deflated and then removed from the extremity. After tourniquet deflation, patients were continuously monitored for cardiac arrhythmias and blood pressure changes and CNS side effects like dizziness, light headedness, tinnitus or presence of metallic taste.

Post-operative analgesia was assessed every 15 minutes as per VAS in the first hour and later every one hour till score was 4 or more. When VAS >4, inj. diclofinac in a dose of 1.5 mg/kg diluted in 10 ml normal saline was given. Time required for administration of first analgesic was noted down. Time elapsed from tourniquet release to administration of first analgesic was noted down. Time elapsed from tourniquet release to administration of first analgesic was considered as duration of post-operative analgesia. Patients were followed up for 24 hours post operatively for occurrence of local effects like skin rash, oedema, hematoma and neurological injury and are treated as needed.

RESULTS:

GROUP L: Patients received *intravenous regional anaesthesia* with 0.5% lignocaine (preservative free) 4mg/kg diluted in saline up to 40 ml (maximum dose 200 mg)

GROUP R: Patients received *intravenous regional anaesthesia* with 0.2% ropivacaine (preservative free) 1.5mg/kg (maximum dose 80mg). Demographic data related to age, sex and weight were taken into consideration in both the groups.

Table 1: Duration of Surgical Procedures

Duration of Surgery (min)	Group L (No of Patients)	Group R (No of Patients)
41-50	09	08
51-60	10	09
61-70	25	23
71-80	06	10
Total	50	50
Mean ± SD	7.5±3.80	7.5±2.40

Table shows that no significant difference was found in mean operative time of surgery between two groups i.e 0.95 (p>0.05)

Table 2: Tourniquet Time

Tomiquet Time (mins)	Group L (no. Of Patients)	Group R (no. Of Patients)
51-60	4	3
n61-70	9	11
71-80	8	6
81-90	9	10
TOTAL	30	30
Mean ± S.D. (mins)	7.5 ± 2.38	7.5 ± 3.69

No significant difference was found in tourniquet time between the two groups i.e 0.96 (P>0.05)

Table 3: Side effect after release of Tourniquet

VAS Score	Group L (No of Patients)	Group R (No of Patients)
Lightheadedness	4	0
Metallic taste	1 (2%)	0
Tinnitus	1 (2%)	0

There was no evidence of side effects after the release of tourniquet in 0.2% ropvacaine group as compared to 0.5% lignocaine group.

Table 4: Grade of Sensory Blockade

GRADE OF SENSORY BLOCKADE	GROUP L (no. of patients)	GROUP R (no. of patients)
1	0	0
2	0	0
3	20	20
4	8	12
MEDIAN	4	6

The difference in grade of sensory blockade was statistically insignificant (P>0.05)

Table 5: Grade of Motor Blockade

GRADE OF MOTOR BLOCKADE	GROUP L (no. of patients)	GROUP R (no. of patients)
1	0	0
2	14	19
3	11	11
4	3	2
MEDIAN	7	6.5

The difference in grade of motor blockade was statistically insignificant (P>0.05)

DISCUSSION:

Intravenous regional anaesthesia is safe, simple to administer and effective method of providing anaesthesia for surgeries on the extremities. It is ideal for short procedures on an ambulatory basis. Local anaesthetics such as lignocaine, prilocaine are commonly administered for intravenous regional anaesthesia. However, the anaesthetic agents commonly used for example lignocaine 0.5% has a relatively short duration of action, which may affect the duration of intra operative analgesia, tourniquet tolerance and redistribution of drug after tourniquet release.

Ropivacaine, a newer amide local anaesthetic is structurally related to bupivacaine with almost similar duration of action. However, ropivacaine causes less depression of cardiac conduction. Clinical use

of ropivacaine is well established for epidural anaesthesia and peripheral nerve blocks.

The potential use of local anaesthetics that would provide anaesthesia of greater duration than lignocaine with less toxicity than bupivacaine prompted the present comparison of ropivacaine 0.2% and lignocaine 0.5% for intravenous regional anaesthesia In our study, the two groups did not differ with respect to mean age of patients, mean weight of patients, mean of tourniquet time, mean duration of surgery, no statistically significant difference was found between both the groups group(p>0.05).

The onset of sensory block was comparable in lignocaine group (5±2.09) and ropivacaine group (4.29±3.25). The difference in mean time of onset of sensory block between lignocaine group and ropivacaine group was found to be statistically insignificant (P=0.369) similar to Maximilian W.B. et al 1999. Thus our study is supported by the ir study.

In our study the onset of motor block in lignocaine group was 3.75±2.43 and ropivacaine group was 4.28±3.25. The difference in mean time of onset of motor block between lignocaine group and ropivacaine group was found to be statistically significant (P=0.0486). Delayed onset of motor block seen with ropivacaine is due to its lesser ability to penetrate large milinated motor fibers, thus it has selective action on pain transmitting A-Delta and C nerve fibers rather than A-Beta fibers which are involved in motor function. Peng Philip W.H. et al[6] in 2002 observed similar onset between 0.5% lignocaine and 0.375% ropivacaine group. T.T. Niemi et al[7] in 2006 reported similar development of motor block between 0.5% prilocaine group and 0.2% ropivacaine group.

In our study we did not observe any pain on injection of intravenous regional anaesthestic solution. Neither skin rash nor hematoma was seen. Alparslan Turan et al[8] in 2005 reported pain on injection of intravenous regional anaethetic solution in 3 patients in magnesium group and none in the lignocaine group. Acalovschiet al[9] in 2001 noticed skin rash below tourniquet when he added 100 mg tramadol to intravenous regional anaethetic solution. Scott Reuben et al[10] in 2002 reported hematomas at local site when he used ketorolac.

None of the patients in our study develop any local complications after use of 0.5% lignocaine and 0.2% ropivacaine for intravenous regional anaesthesia as we did not use magnesium, tramadol or keterolac. In our study the comparison of grade of sensory between lignocaine group and ropivaciane was statistically insignificant (P>0.05). The comparison of grade of motor block between ropivacaine group and lignocaine group was statistically insignificant (P>0.05).

A double cuffed tourniquet was used in our study thus none of our patients had VAS more then 4 after inflation of distilled tourniquet and non of the patients required any analgesic for tourniquet pain. In our study there were no evident side effects after the release of tourniquet in ropivacaine group. In our study the mean time of recovery from sensory block was 6.43±5.537 in lignocaine group and 2.26 ±6.658 in ropivacaine group, the difference was found to be highly statistically significant (p =0.0001) Maximilian W. B et al[5] in 1999 also observed longer duration of sensory block in ropivacaine group and attributed this to more complete and persistent binding leading to slow release of ropivacaine into systemic circulation.

In our study the mean time of our recovery from motor block was 11.4±6.409 minutes in lignocaine group and 27.1±6.794 minutes in ropivacaine group which was highly statistically significant (p= 0.0001).
Chan V. W et al[11] in 1999 noticed that the recovery from motor block was slowest in the high dose ropivacaine group (1.8 mg/ kg). Motor block was sustained in high dose ropivacaine group for 70 minutes which was significantly longer than the lignocaine group.

In our study, the mean time for first analgesic was 15.83±7.670 minutes in Lignocaine group and 38.43±13.850 minutes in ropivacaine group. The difference between both the groups was statistically significant (p=0.0001). This is due to more lipophilic nature of ropivacaine which stays at the local site for longer time than lignocaine. About 15.6 % of the dose of ropivacaine stays at the local site for up to 20 mins after the release of tourniquet. Attenasoff et al[4] in 2001 observed that the time until first intake of pain medication after injection was longer for 0.2 % ropivacaine group (median 47 min, range 27-340 min) as compared to 0.5% lignocaine group (median 34 min, range 2-140 min. p < 0.05) The number of patients to whom analgesic were administered in the post anaesthetic care unit was lower in the ropivacaine group than in the ropivacaine group.

Limitations of study:
As it was a single centre study the results cannot be genralized to entire population. Furthermore comprehensive and multicentric studies including meta analysis of various earler studies should be done, to have a more meaningful and high impact results.

CONCLUSION:
From the observations and results of our study we conclude that 0.2% ropivacaine can be used as an alternative to 0.5% lignocaine for intravenous having just the similar onset and intensity of sensory block. The duration of sensory and motor block is prolonged along with prolonged post-operative analgesia in 0.2% ropivacaine group, and also safely as compared to 0.5% lignocaine.

Prolonged early post-operative analgesia along with increased safety, are a striking advantages of 0.2% ropivacaine over 0.5% lignocaine used for intravenous regional anaesthesia.

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ORIGINAL RESEARCH PAPER

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INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

A STUDY OF EARLY POST OPERATIVE COMPLICATIONS IN RELATION TO NATURE OF ANESTHESIA AND TYPE OF SURGERY

Anaesthesiology

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ABSTRACT

Background: Many people have complications after surgery; some transient, others serious, but all are important to patients. Anaesthesia resul a variety of metabolic and endocrine responses, but conventional wisdom maintains that anaesthetic technique has little long-term effect on pati outcomes. There is accumulating evidence that, on contrary, anaesthetic management may in fact exert a number of longer-term effects postoperative outcome.

Objectives: To study the incidence of postoperative complications in relation to age, sex and other factors which influence them and to stu correlation of post-operative complications with the nature of anaesthesia, duration of operation, type of surgery and in surgery above diaphragm below diaphragm.

Material and Methods: A prospective study of early post-operative complication in 100 patients', who underwent major surgery, was done in t Department of Anesthesia in a tertiary care teaching hospital, Unnao.

Results: The incidence of post-operative complications was more in patients operated with general anaesthesia (50% and 14% respectively) morbidity and mortality in patients who were operated under spinal anaesthesia was lower than general anaesthesia, but morbidity was higher patients who were operated under epidural anaesthesia, but mortality was higher than epidural.

Conclusion: There is accumulating evidence that anaesthetic management may indeed exert a number of influences on longer term postoperati outcomes. Further prospective, randomized, large scale, human trials with long- term follow-up are required to clarify the association betwe anaesthesia technique and postoperative outcome.

KEYWORDS

Anaesthesia, Emergency surgery, Elective Surgery, Morbidity, Mortality, Post-operative complications, Surgical complications

Introduction:

Anaesthesia can cause many complications, but in general we can think of them as centred on the airway, respiratory or circulatory systems. For some there is debate about where 'anaesthesia' complications end and 'surgical' complications start. For example, postoperative pneumonia may be caused by the abnormal ventilation that occurs under anaesthesia as well as the positioning for surgery and the surgical incision that makes breathing and coughing painful, shallow and ineffective. Modern anaesthetic practice is aimed at being safe and avoiding complications.[1,2]

Anesthesia is commonly classified into two main techniques: general anesthesia in which drugs achieve central neurologic depression, and regional anesthesia, in which drugs are administered directly to the spinal cord or nerves to locally block afferent and efferent nerve input.[3,4] After surgery, the risk of fatal or life threatening events like deep vein thrombosis, pulmonary embolism, myocardial infarction, transfusion requirements, pneumonia and renal failure are increased several fold. but there is debate about whether the type of anesthesia has any substantive effect on these risks. Neuraxial blockade has several physiological effects that provide a rationale for expecting to improve outcome with this technique.[5] It is logical to hypothesize that a "stress-free" perioperative period may attenuate or prevent detrimental physiologic responses and decrease resultant morbidity.[2] Progress is rapid, and dissemination of such information is unprecedented.

Never before has our means of communications within the medical profession been better. Ideally, no-one would have a complication after surgery. Some complications may be avoidable whilst others inevitable in some circumstances. In some circumstances patients may choose not to proceed with their surgery once they at all stages of the patients perioperative 'journey' there are techniques and strategies that health care professionals can use to help stop postoperative complications. Some of these are generally accepted (eg timely antibiotics) whilst others are gaining increasing prominence such as the concept of a 'perioperative physician'.[1,2]

For the purpose of description, the post-operative complications are divided into early and late. Early complications, if neglected may be hazardous and increase hospitalization time and mortality in a given series of operations. But if known and managed accordingly, will decrease the mortality and morbidity in post-operative phase.

Aim and Objectives:

To study the incidence of postoperative complications in relation to age, sex and other factors which influence them and to stu correlation of post-operative complications with the nature anaesthesia, duration of operation, type of surgery and in surge above diaphragm or below diaphragm.

Material and Methods:

It was a prospective study of early post-operative complication in 10 patients', who underwent major surgery, was done in the Department Anesthesia in a tertiary care teaching hospital, Unnao. Patients wh underwent major surgery during the period of year 2017-2018 wer taken for the study in the present series. Major surgery was considere when operation was done under anaesthesia, where duration Surgery was prolonged, and risk of complications were more or whe the vital organ was operated upon.

But not one of the above criteria makes an operation major but taking into consideration of all above and other factors the surgery wa defined as major. Each case was studied under following heads fro the available case records like demographic data, presentin complaints, past illness, personal history, general, local and systemi examination findings.

Study of investigations was done for the confirmation of diagnosis an screening of patients for associated diseases. A detailed study o operation notes for the type of operation, duration of operation, type o anaesthesia, elective or emergency surgery and any complication during operation or during recovery from anaesthesia were noted Appearance of complications was recorded in chronological order The study was done correlating the various factors which influenced the mortality and morbidity in postoperative phase.

Results:

In the present study 100 cases who underwent major surgery were included out of which 70 patients underwent elective surgery and 30 patients were operated in emergency. Out of them 80 were males and 20 were females. Out of 100 cases surgery below diaphragm was performed in 90 patients and above diaphragm was operated in 10 patients. Out of 100 patient's complications occurred in 35 patients (35%) and the mortality were 10% of all operations.

Table 1: Sex wise distribution of complications

Sex	No of Surgery	%	No of complications	%	Mortality	%
Male	80	80	25	31.25	08	10
Female	20	20	10	50	02	10
Total	100	100	35	35	10	10

le 1 shows that inciden her in females 50% but

e 2 shows that the in dominantly higher in p ents above 51 years of ents under 10 years an groups of patients.

le 3 represents that i h higher in below erwent surgery above evident that the inc phragm surgery (10 %).

ble 2: Age wise distri

Age years)	No of Surgery	%
0-10	05	0
11-20	12	1
21-30	20	2
31-40	17	1
41-50	22	2
51-60	14	1
61-70	05	0
>70	05	0
Total	100	1

ble 3: Type of surge

Type of surgery	No of Surgery
Above diaphragm	10
Below diaphragm	90
Total	100

ble 4 represents th d mortality was m 50% and 14% respe ho were operated anaesthesia, but mor nder epidural anaes

Table 4: Complicat

Anesthesia	No o Surge
General	50
Spinal	35
Epidural	15
Total	100

Table 5: Distrib elective surgery

Type of complica
Cardiovascular
Arrhythmias
Peripheral circula
than haemorrhag
Haemorrhagic sh
Cardiac arrest
Total
Urinary compli
Retention of urin
UTI
Uremia
Acute renal fail
Total
Wound compli
Infection
Minor gaping
Burst abdomen

...e 1 shows that incidence of post-operative complications is much ...r in females 50% but the incidence of mortality is equal 10%.

...e 2 shows that the incidence of post-operative complications is ...dominantly higher in patients below the age of 10 years (60%) and ...nts above 51 years of age (57%); similarly, mortality was high in ...nts under 10 years and above 51 years of age as compared to other ...groups of patients.

...e 3 represents that incidence of post-operative complications is ...higher in below diaphragm (35%) then in patients who ...went surgery above diaphragm (30%), from the same table it is ...evident that the incidence of mortality is comparable in above ...phragm surgery (10%) and patients below diaphragm surgery ...%).

...e2: Age wise distribution of complications

Age ...ears)	No of Surgery	%	No of complications	%	Mortality	%
0–10	05	05	03	60	02	40
11–20	12	12	03	25	00	00
21–30	20	20	04	20	01	05
31–40	17	17	05	29	01	06
41–50	22	22	07	32	03	13.6
51–60	14	14	08	57	01	07
61–70	05	05	03	60	02	40
>70	05	05	02	40	00	00
Total	100	100	35	35	10	10

...le3: Type of surgery above and below diaphragm

Type of ...urgery	No of Surgery	%	No of complications	%	Mortality	%
Above ...iaphragm	10	10	03	30	01	10
Below ...iaphragm	90	90	32	35.5	09	10
Total	100	100	35	35	10	10

...le 4 represents that the incidence of post-operative complications ...d mortality was more in patients operated with general anaesthesia ...0% and 14% respectively) the morbidity and mortality in patients ...ho were operated under spinal anaesthesia was lower than general ...naesthesia, but morbidity was higher in patients who were operated ...nder epidural anaesthesia, but mortality was higher than epidural.

Table 4: Complications in relation to type of anesthesia

Anesthesia	No of Surgery	%	No of complications	%	Mortality	%
General	50	50	25	50	07	14
Spinal	35	35	07	20	02	5.7
Epidural	15	15	03	20	01	6.6
Total	100	100	35	35	10	10

Table 5: Distribution of various complications in emergency/ elective surgery

Type of complication	Number	Percentage (%)
Cardiovascular complications		
Arrhythmias	01	01
Peripheral circulatory failure, Other than haemorrhagic shock	08	08
Haemorrhagic shock	02	02
Cardiac arrest	01	01
Total	12	12
Urinary complications		
Retention of urine	07	07
UTI	08	08
Uremia	01	01
Acute renal failure	01	01
Total	17	17
Wound complications		
Infection	15	15
Minor gaping	04	04
Burst abdomen	01	01
Total	20	20
Respiratory complications		
Pneumonia	06	06
Pleural effusion	02	02
Respiratory arrest	01	01
Pneumothorax	01	01
Total	10	10
Gastrointestinal complications		
Vomiting	06	06
Diarrhoea	03	03
Peritonitis	02	02
Anastomotic leak	01	01
Total	12	12
Miscellaneous complications		
Toxemia and septicemia	06	06
Hyperpyrexia	02	02
Bed sores	01	01
Total	09	09

Study showed the patients who are associated with predisposing systemic disease in them the incidence of post-operative complications and mortality is higher.

The present study also revealed that post-operative complications are more in patient having systemic disease 72.72% as compare to patients who have no systemic disease 35.59% as well as it is evident that mortality is more in group of patients having systemic disease 27.27% and less in normal group of patients 7.8%.

Discussion:

Complications in surgery are always of concern to surgeon. There have been various studies on the different aspects of post-operative complications like correlation of predisposing factors, risk groups of patients, relation to type of surgery and so on. In the present study had 100 cases of major surgery for the incidence of early post-operative complications and their relation to various factors which influence the morbidity and mortality.

Out of 100 patients subjected to major surgery 70 (70%) underwent elective surgery and 30 (30%) had emergency surgery. HDU: High Dependency unit; PACU: Post Anaesthetic Care Unit.[1,3]

Haemorrhage can be classified as:

- 'Primary': occurring when a vessel is cut during surgery.
- 'Reactionary': occurring when rises in blood pressure at the end of the operation cause vessels that had previously not been bleeding to start to do so.
- 'Secondary': normally due to infection which causes damage to a vessel day after surgery. The increased risk of haemorrhage may be multi-factorial in origin.[1,5]

Post-operative infections can be classified by both site and cause.

Surgical site infection (SSI)

SSIs can complicate recovery in 5% of patients; risk factors include intra-operative exposure to endogenous organisms (e.g. during bowel surgery), prolonged surgery and impaired immunity (e.g. diabetes, immunosuppresion) (NICE, 2008). Management may require antibiotics, suture removal and debridement with open wound care (NICE, 2008).[5,7]

Central venous catheter infection

Infection of central venous catheters (CVC) may lead to catheter related blood stream infections (CRBSI) that can have a 25% mortality.

CVCs should be reviewed daily and CRBSI should be suspected when there is a CVC and signs of bacteraemia; a positive blood culture and growth of the same organism from the CVC would support the diagnosis. CVC's should always be removed as soon as they are not needed. Inflammation around the CVC insertion is relatively uncommon, and its absence does not rule out CRBSI.[5]

Urinary tract infection

Urinary catheters are inserted perioperatively to facilitate surgery or to aid fluid balance management. They do, however, predispose patients

to urinary tract infections that may need antibiotic treatment.

Abdominal collections

Abdominal collections are more likely if there is leak of bowel contents. They may present with nausea, malaise, pain, swinging fever, localised peritonitis or tenderness and altered bowl function and the onset of symptoms is determined by abscess location: pelvic abscesses tend to occur 4-10 days after surgery whilst subphrenic abscesses occur 7-21 days after surgery.[6]

Limitations of study

As it was a single centre study the results cannot be genralized to entire population. Furthermore comprehensive and multicentric studies including meta analysis of various earler studies should be done, to have a more meaningful and high impact results.

Conclusion:

Postoperative complications are always a concern to surgeon. Early postoperative complications after major surgery occurred in significant number and must be anticipated in time and proper measures instituted to control them. Incidence of early post-operative complications was significantly higher in emergency surgery than in elective surgery. Major risk factor was unhealthy preoperative status especially dehydration, anaemia, malnutrition, electrolyte imbalance and infection, which significantly increase the morbidity and mortality of postoperative complications. Morbidity and mortality was more in very young patients due to low birth weight, emergency surgery, technical error and the fact that children were more prone to complications of anaesthesia and in patients over 50 years age. Morbidity and mortality of postoperative complications increase with age.

Post-operative complications are an important cause of morbidity, mortality, extended hospital stay and increased costs. Complications can be general or specific to particular operations. There are many strategies to prevent postoperative complications. Assessment of surgical complications should include a focussed history with particular attention to risk factors.

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A Comparative Evaluation of the Effects of Oral Lorazepam, Alprazolam and Diazepam on Venous Admixture

A Naqib*, B Mir**, A Beigh***

Abstract

- **Objective : To compare the effects of oral diazepam, lorazepam and alprazolam premedication on venous admixture.**
- **Material and Methods : One hundred fifty patients divided in three groups were included in the study. The venous admixture was determined using the ISO-shunt nomogram. The values obtained 90 minutes after administration of the drugs were compared with the values before the drug administration. The Student's t-test was applied to find out the significance.**
- **Results : These were highly significant change in increase in venous admixture (Qs/Qt) in group I patients 90 minutes after premedication as compared to premedication values. There was statistically insignificant difference in venous admixture (Qs/Qt) in group II and group III patients 90 minutes after premedication as compared to premedication values.**
- **Conclusion : From the present study it can be concluded that 2 mg of oral lorozepam given 90 minutes before surgery to healthy patients have significant effects on venous admixture. However, the effects of alprazolam and diazepam had no significant effect on venous admixture. (J Assoc Physicians India 2002;50:387-390)**

Introduction

Venous admixture refers to the quantity of mixed venous blood which would be required to mix with pulmonary end capillary blood to produce the observed difference between the arterial and pulmonary end capillary blood PO_2 (by convention pulm red capillary PO_2 =. PAO_2) venous admixture markedly reduces PaO_2 with little effect on $PaCO_2$. The fall in PaO_2 being greater in the better oxygenated patients. The effect of venous admixture on blood gases usually is not recognised clinically. Various studies[2-4] demonstrated substantial increase in various admixture during anaesthesia and suggested that there is development of shunt, or areas of low V/Q ratio or a mixture of the two or opening of arteriovenous pulmonary anastamosis.

With this background the present study was attempted to evaluate the effects of oral diazepam, lorazepam and alprazolam. Premedication on venous admixture 90 minutes after its administration.

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Material and Methods

This study was carried out in 150 young adult patients of either sex with physical status I scheduled for different surgical procedures. The procedure was explained to all the patients and consent was obtained from all the patients.

All the patients were visited on the day before surgery when base-line values of heart rate, systolic and diastolic arterial pressure and respiratory rate were measured after each subject had been lying quietly in his bed for one hour.

In the reception room of the operation theatre radial artery puncture was performed under local anaesthesia with 1% lignocaine. With the patient breathing room air the first arterial sample was taken. Blood gases were measured immediately using the ABL-330 radiometer, Copenhagen.

Then one of the drugs labelled as :-

Group I : Received lorazepam 2 mg as oral premedication

Group II : Received alprazolam 0.5 mg orally

Group III : Receive diazepam 10 mg orally

After 90 minutes of drug intake second arterial sample was taken and analysed for blood gas analysis. The values obtained from ABL-330 were pH, PO_2, PCO_2

PAO_2 (alvealor PO_2) was calculated using the simplest

$PAO_2 = \frac{PIO_2 - PaCO_2}{R}$

Where PIO_2 = Inspired PO_2

$PaCO_2$ = Aterial PCO_2

R = Respiratory quotient (value = 0.8)

PIO_2 was calculated as under :

$PIO_2 = FIO_2$ (PB-47) in mm mg

Where FIO_2 = Fraction of inspired oxygen (21%)

PB = Ambient atmospheric pressure.

Then $(PAO_2\text{-}PaO_2)$ values were determined and compared statistically before and after premedication.

Venous admixture (Qs/Qt) were determined using the O-shunt nomogram and one group was compared with e other group using the students t-test for finding out the gnificance.

esults

The changes in pH, PaO_2, $PaCO_2$ and $(PAO_2\text{-}PaO_2)$ are own in Table 2 and Table 3. There was a statistically significant drop in PaO_2 value in group I (Lorazepam) patients 90 minutes after premedication ($P < 0.01$). There was statistically in significant change in group II (Alprazolam) and group III patients (Diazepam) 90 minutes after premedication ($P < 0.1$). The pH and $PaCO_2$ values did not show statistically significant difference in all the three group before premedication and 90 minutes after premedication. There was a statiscally significant ($P < 0.01$) increase in $P(A\text{-}a)O_2$ in group I patients 90 minutes after premedication as compared to premedication values. The $P(A\text{-}a)O_2$

Groups	I Lorazepam	II Alprazolam	III Diazepam
Age (Years)	18-48	20-45	19-44
Weight (Kg)	42-72	44-67	42-73
Sex (M:F)	15:35	16:34	14:36
Number	50	50	50

There were no significant difference between drug groups by analysis of variance

Table 2 : Before premedication

oup	I Lorazepam	II Alprazolam	III Diazepam	Remarks
$)_2$ (mmHg)				
ige	62.21-91.3	67.7-90.2 / 29.51-42	73.91-90.4	
an ± SD	79.68 ± 6.63	34.28 ± 3.018, 79.362 ± 5.973	83.59 ± 4.28	
	< 0.01	0.1	< 0.1	
	Significant	N.S.	N.S.	
$)_2$ (mmHg)				
ge	28.81-40.12	29.51-42.53	29.31-38.09	Statiscally
an ± SD	33.69 ± 2.945	34.28 ± 3.018	33.624 ± 2.247	significant
	< 0.01	> 0.5	< 0.3	
	N.S.	N.S.	N.S.	
A-2)O_2				
ge	0.05-30.08	0.91-20.96	0.53-16.3	
n ± SD	7.69 ± 5.94	7.535 ± 4.52	5.669 ± 3.805	
	< 0.01	> 0.50	< 0.4	
	HS	NS	NS	NS
values)				
ge	7.330-7.482	7.35-7.46	7.33-7.40	
n ±	7.389 ± 0.0	7.405 ± 0.0289	7.3914 ± 0.373	
	0.01	< 0.1	0.01	
	NS	Significant	NS	NS
)t (values) (Various admixture)				
ge	0-27	0-22	0-16	
n ± SD	9.87 ± 6.356	10.12 ± 5.85	7.861 ± 4.082	
	< 0.01	0.1	< 0.1	
	Highly significant	N.S.	N.S.	

parison of mean values (± SD) before premedication: $P < 0.001$ for Group I V/s Group II and Group I V/s Group - II; $P < 0.01$ for p II V/s Group III

Alprazolam premedication

Group	I	II	III
PaO_2 (mmHg)			
Range	48.31-86.42	69.5-89.3	71.01-88.8
Mean ± SD	75.11 ± 6.68	77.47 ± 5.311	82.02 ± 3.836
$PaCO_2$ (mmHg)			
Range	29.81-40.21	30.31-40.37	30.4-37.08
Mean ± SD	33.90 ± 2.824	34.54 ± 2.826	30.0-37.08
(PAO_2-PaO_2) (mmHg)			
Range	3.93-83.47	0.350-20.61	0.45-14.68
Mean ± SD	12.05 ± 6.12	9.10 ± 5.023	6.42 ± 3.487
pH (values)			
Range	7.331-7.480	7.32-7.44	7.32-7.45
Mean ± SD	7.3898 ± 0.0358	7.394 ± 0.0272	7.383 ± 0.0311
Qs/Qt (values) (Venous admixture)			
Range	3-40	0.20	1.5-18
Mean ± SD	14.08 ± 6.483	11.98 ± 5.247	9.239 ± 3.794

Comparison of mean values after premedication

Table 4 : Comparison of the effects of lorazepam (Group I), alprazolam (Group II) and diazepam (Group III) on Qs/Qt%

	Group I	Group II	Group III	Remarks
Changes in QS/QT%	4.21 ± 1.283	1.86 ± 1.114	1.37 ± 0.788	

P < 0.001 for Group I vs Group II and Group I vs Group II; P < 0.01 for Group II vs Group III

changes in group II and group III were insignificant 90 minutes after premedication (Table 3). There was highly significant changes increase in veinous admixture (Qs/Qt) in group I patients 90 minutes after premedication as compared to pre medication values. There were statistically insignificant (P=<0.1) difference in venous admixture (Qs/Qt) in group II and group III patients 90 minutes after premedication as compared to premedication values Table 3. A highly significant effects of lorazepam on venous admixture (Qs/Qt) was seen when compared to effects of alprozalam. When lorazapam venous admixture effects were compared with diazepam a highly significant change was seen. When alprazolam was compared with diazepam a significant effect on venous admixture was seen (Table 4).

Discussion

Measurement of alvealar arterial oxygen tension gradient $P(A\text{-}a)O_2$, during room air breathing is one of the tests used to detect "early lung function". In the healthy young adults breathing air (PAO_2 PaO_2) does not exceed 2KPa (15 mm mg) but it increases to about 5 KPa (37.6 mm mg) in the healthy aged subjects.[5] Abnormally high $P(A\text{-}a)O_2$ during room air breathing has been reported in asymptomatic smokers,[6] and in $P(A\text{-}a)O_2$ is a sensitive means of detecting regional ventilation perfusion in equalities. The measurement of $P(A\text{-}a)O_2$ is limited to giving only a qualitative estimate of the degree of intrapulmonary shunting. It will vary with changes in inspired oxygen concentration as well as with change in cardiovascular status.[8]

Effects on venous admixture (Qs/Qt) of all the three drugs was that the increase in venous admixture parallels the increase in $P(A\text{-}a)O_2$.

There was a highly significant ($P < 0.01$) increase in Qs/Qt in lorazepam (Group I) after 90 minutes of oral administration. This effects of lorazepam on Qs/Qt was in the same direction as in alprazolam group II and in diazepam (Group III) when the effect of lorazepam on venous admixture (Qs/Qt) was compared with that of alprazolam and diazepam there was a highly significant difference ($P < 0.001$) indicating that the effects of lorazepam are due to increased venous admixture with subsequent change in $P(A\text{-}a)O_2$ and PaO_2.

When alprazolam was compared with diazepam there was a significant increase in venous admixture ($P < 0.01$) with alprazolam this finding was parallel to the effect of alprazolam on $P(A\text{-}a)O_2$ as compared to diazepam ($P < 0.001$).

It is interesting to note that the changes in Qs/Qt and $P(A\text{-}a)O_2$ due to alprazolam were variable with that of diazepam and differed significantly but the effect of alprazolam and diazepam was comparable concerning pH, $PaCO_2$ and PaO_2.

However, the PaO_2 values of group III (Diazepam) patients were significantly different from those of Group II (Alprazolam) patients. The patient characteristic of the two groups (Diazepam and Alprazolam) were comparable. This study demonstrated that the effects lorazepam on PaO_2, $P(A\text{-}a)O_2$ and Qs/Qt are highly significant and differ significantly from those of alprazolam and diazepam. The likely explanation can be that there is a correlation between the clinical effects and its plasma levels. Even when given IV there is a delay of 30-40 minutes in the onset of maximum sedative effect and drowsiness and persisting for at least four hours.[9] Maximum (65%) of patients either fell asleep or were very drowsy after 90 minutes of oral administration of lorazepam. It is less lipid soluble then diazepam and has lesser plasma protein binding making more of the free drug available for clinical effects.

Although the magnitude of changes shown by the

drugs (Benzodiazepines) is probably physiologically insignificant and did not endanger the patients, caution should be used in the administration of these drugs to COPD patients. Such drugs are particularly contra, indicated the patients with existing hypoxaemia and hypercapnia at rest.

From this study it is concluded that the effect of oral lorazepam (2 mg) 90 minutes before its administrative increase venous admixture. This was shown by significant changes in PaO_2 and $P(A\text{-}a)O_2$.

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ANAESTHETIC CONSIDERATIONS

A Comparative Evaluation of the Effects of Oral Diazepam, Lorazepam and Alprazolam Premedication on the Arterial Blood Gases

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Arterial blood gas analysis was performed before and 90 minutes after 2 mg of lorazepam, 0.5mg of alprazolam and 10 mg of diazepam oral premedication on 150 ASA-I patients undergoing different surgical procedures. There was

- Significant ($p<0.01$) decrease in arterial oxygen tension (PaO_2)
- A significant ($p<0.01$) increase in alveolar arterial oxygen tension gradient ($p(A-a)O_2$)
- A significant ($p<0.01$) increase in venous admixture (Qs/Qt); 90 minutes after oral lorazepam (2mg) administration.

There was no significant change in pH and $PaCO_2$ after administration of all the three drugs. No significant change was observed in PaO_2, $p(A-a)O_2$ and Qs/Qt after diazepam and alprazolam administration. However, alprazolam produced a significant ($p<0.01$) change in $P(A-a)O_2$ and Qs/Qt when compared to changes produced by diazepam. It is evident that the changes predominantly occur due to venous admixture. It is suggested therefore that caution is demanded in using these drugs as premedicants in patients with compromised cardiopulmonary status.

Premedication refers to administration of a drug or drugs prior to induction of anaesthesia for producing specific pharmacologic responses.

Introduction

Premedication refers to administration of a drug or drugs prior to induction of anaesthesia for producing specific pharmacologic responses. It is given to blunt the relationship between emotional factors and cardiovascular effects by blocking the neuro-endocrine response to stress. Experience of most anaesthesiologists has shown that "the anxiety relief" is the single most important purpose of premedication. Benzodiazepines are the commonly used premedicants specific for anxiety relief and amnesia. The time of onset, intensity and duration of clinical action after single dose of benzodiazepines are of great importance for using them as oral premedicants.[1] The present study was designed to elucidate the effects of oral diazepam, lorazepam and alprazolam on arterial oxygen tension (PaO_2): arterial carbon-di-oxide tension ($PaCO_2$), alveolar-arterial PO_2 difference $P(A-a)O_2$ and pH: 90 minutes after the administration of these premedicants.

Material and Methods

This prospective, randomized double-blind study was conducted at the Institute of Medical Sciences, Srinagar, J & K. 150 adult patients of either sex with physical status ASAI were studied. Informed consent for the study was obtained from the patients. Patients were allocated to three groups viz; 1, II, III of 50 each. ABG analysis was done by ABL-330 of Radiometer Copenhagen before, and 90 minutes after oral administration of either diazepam 10 mg, or lorazepam 2mg or alprazolam 0.5 mg and the pH, PCO_2 and PO_2 values determined.

PaO_2 was calculated using the "Ideal alveolar gas" equation i.e.

$$PaO_2 = PiO_2 - \frac{PaCO_2}{R}$$

where PiO_2 is the partial pressure of inspired oxygen found out as under:

$PiO_2 = FiO_2 (PB - 47)$ mmHg.

The venous admixture Qs/Qt was determined using the isoshunt diagram (Fig.1).

The values of the above parameters obtained 90 minutes after drug administration were compared with pre-administration values. The student's test was used to find out the statistical significance.

Table 1 : pH values before and after premedication

Group	Before Premedication (Mean±SD)	After Premedication (Mean±SD)	Significance
Lorazepam	7.389±0.0381	7.3898±0.0358	p=NS
Alprazolam	7.405±0.0289	7.394±0.0272	p=NS
Diazepam	7.3914±0.373	7.383±0.0311	p=NS

NS = Not Significant

Table 2 : $PaCO_2$ (mmHg) values before and after premedication

	Before Premedication (Mean+SD)	After Premedication (Mean+SD)	Significance
Lorazepam	33.69±2.945	33.90±2.824	NS
Diazepam	33.624±2.247	34.304±2.2078	NS
Alprazolam	34.28±3.018	34.54±2.826	NS

NS = Not significant

Results

In all the three groups, the sex ratio was comparable, however the number of female patients (35:34:36) was more than the number of male patients (15:16:14). Age (years) i.e. 36.48±2.34; 32.03±6.306; 30.94±7.32; as well as body weight (Kilograms) 57.58±7.869; 55.28±6.376; 54.72±7.777; and haemoglobin values (grams/decilitre) 12.16±1.98; 12.77±1.00; 12.25±1.360 were also comparable in all the three groups of lorazepam, alprazolam and diazepam respectively. There was no significant effect observed on pH by the drugs (Table 1).

No statistically significant change was observed in $PaCO_2$ (mmHg) values in all the three groups 90 minutes after oral premedication as compared to premedication (Table 2).

There was significant ($p=<0.01$, $t=3.4288$) decrease in PaO_2 (mmHg) values due to lorazepam 2mg, 90 minutes after its oral administration (Table III), while insignificant decrease in PaO_2 ($p=0.1$) due to alprazolam 0.5 mg as well as diazepam 10mg was seen.

A significant increase ($p<0.01$) in $P(A\text{-}a)O_2$ occurred in lorazepam group. There was even an increase in $P(A\text{-}a)O_2$ in alprazolam and diazepam group but the changes were insignificant (Table 4).

A highly significant increase in venous admixture (Qs/Qt) was noted in lorazepam group while nonsignificant increase occurred in alprazolam and diazepam groups. A highly significant effect of lorazepam was seen on Qs/Qt when compared to that of alprazolam ($p<0.01$) as well as diazepam ($p<0.01$).

A significant effect of alprazolam was also seen on Qs/Qt when compared to that of diazepam ($p=0.01$) (Table 5).

DISCUSSION

Ventilation is normally well regulated to ensure blood gas homeostasis. Ventilation maybe measured or its effectiveness assessed by measurement of blood gas tensions. It avoids the direct measurement of ventilation, renders breathing more natural, avoids increased dead space, allows greater subject mobility and facilitates measurement during sleep.[2]

In the healthy young adult, breathing air, $P(A\text{-}a)O_2$ does not exceed 15 mmHg but is increased to about 37.6mmHg in the healthy aged subject.[3] The measurement of $P(A\text{-}a)O_2$ is limited to giving only a qualitative estimate of the degree of intrapulmonary shunting. It will vary with changes in cardiovascular status.[4] The mean ages of group I, group II and group III patients were 36.48±8.230, 32.02±6.306 and 30.94±7.320 years respectively showing that patients of lorazepam group (I) were elder than those of the other two groups of alprazolam (II) and diazepam (III).

The pattern of pH values in all the three groups showed no statistically significant difference between the control (premedication) values and the post-premedication values. The mean pH values in the pre-medication period were 7.389 ±0.881; 7.405±0.0289; 7.39±0.0373 in groups I, II and III respectively. This is in accordance with the finding of Man, Ksu and Sproule[5] who evaluated the efficacy of alprazolam in relieving dyspnoea in patients with COPD, and no significant change in pH (7.43±0.03 *vs* 7.45±0.03).

The results of this study concerning effect of oral benzodiazepines on pH are also in accordance with the studies of Gardiner and Palmer.[6]

This study demonstrates a statistically significant decrease in PaO_2 after lorazepam 2mg administration (average decrease = 4.57 mmHg) ($p<0.01$) which differs significantly from that of the other two groups (1.89 and 1.57 mmHg for alprazolam and diazepam respectively). This change was not detected clinically.

Table 3 : PaO_2 (mmHg) values before and after premedication

Group	PaO_2 mmHg Before premedication	Mean±SD After premedication	t	p	Remarks
Lorazepam	79.89±6.63	75.11±6.68	3.4288	<0.01	HS
Alprazolam	79.362±5.973	77.47±5.311			NS
Diazepam	83.59±4.238	82.02±3.368			NS

HS = Highly significant; NS = Not significant

Table 4 : P(A-a)O_2 mmHg values before and after premedication

Group	P(A-a)O_2 mmHg Before Premedication	Mean±SD After Premedication	P	Remarks
Lorazepam	7.69±5.94	12.05±6.12	<0.01	Significant
Alprazolam	7.535±4.52	9.10±5.023		Insignificant
Diazepan	5.669±3.805	6.42±3.805		Insignificant

G.C.W. Man *et al,*[5] studied effect of alprazolam on exercise and dyspnoea in patients with COPD. Alprazolam 0.5 mg b.i.d was administrated for one week. They reported a significant effect of medication on resting PaO_2 ($p<0.05$). However, the effect was not significant statistically after exercise. In our study we used single dose of alprazolam 0.5 mg in young adult patients so the results are evident that alprazolam has no significant effect on PaO_2.

This study demonstrated that the effects of lorazepam, diazepam and alprazolam are variable on P(A-a)O_2. Lorazepam produces a highly significant ($p<0.01$) change (increase) 12.05 *vs* 7.69 mmHg in P(A-a)O_2 90 minutes after oral administration. While there was a non-significant increase due to alprazolam (9.108 *vs* 7.535) 90 minutes after its oral administration, the same was true about diazepam in which insignificant increase in the P(A-a)O_2 was demonstrated.

There was a highly significant ($p<0.01$) increase Qs/Qt% in lorazepam group from 9.87±6.356 to 14.08±6.483 after 90 minutes of oral administration. The effect of lorazepam on Qs/Qt% was in the same direction as of alprazolam (10.12±5.857 and 11.98±5.245 pre-drug *vs* post-drug) and diazepam (7.861±4.082 and 9.239±3.794).

When the effect of lorazepam on venous admixture (Qs/Qt%) was compared with that of alprazolam and diazepam there was highly significant difference ($p<0.01$) indicating that the effect of lorazepam is due to increased venous admixture with subsequent change in P(A-a)O_2 and PaO_2. When alprazolam was compared with diazepam there was a significant increase in venous admixture ($p<0.01$) with alprazolam. This finding was parallel to the effect of alprazolam on P(A-a)O_2 as compared to diazepam. Despite the above changes, none of the patients after premedication showed any clinical signs of importance such as tachycardia, hypertension, tachypnoea etc. This is probably because they all had normal cardiorespiratory function and quite large degrees of venous admixture are needed to produce clinically recognizable reduction of blood oxygen content.[6] These changes however, may be of clinical importance in patients with cardiac or respiratory diseases e.g., Fallot's tetralogy or pulmonary collapse or consolidation requiring general anaesthesia which in itself increases venous admixture.[7,8] The addition in benzodiazepine premedication, of a narcotic with its respiratory effect may aggravate these changes.

Table 5 : Venous admixture (Qs/Qt) values before and after premedication

Group	Qs/Qt value Before Premedication	Mean±SD After Premedication	t	p	Remarks
Lorazepam	9.87±6.356	14.08±6.483	3.3278	<0.01	HS
Alprazolam	10.12±5.857	11.98±5.247	1.6722	0.1	NS
Diazepam	7.861±4.082	9.239±3.794	1.749	0.1	NS

HS =Highly significant ; NS =Not significant

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(15)

Christian Medical College, Ludhiana

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This is to certify that ....Dr. Bashir Ahmad Mir, Associate.....Professor

Department of .....Anesthesiology....., from G.M.C. Baramulla, J&K.

has participated in the **Revised Basic Course Workshop** held from 4-6 Nov. 2019 at the MCI Nodal Centre, Christian Medical College, Ludhiana, Punjab.

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Principal
CMC, Ludhiana.

Dr. Dinesh Badyal
Convener
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Dr. Anjali Jain
Co-convener & Incharge,
Revised Basic Course Workshop
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Dr. Jeyaraj D. Pandian
Principal
CMC, Ludhiana.
Dated: 9th Nov. 2019

Dr. Dinesh Badyal
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MCI Nodal Centre

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Curriculum Implementation Support Program II

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Dated:- 25-09-2020

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6TH POSTGRADUATE RESEARCH PRESENTATION PROGRAMME

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This is to certify that DR. Mir Bashir Ahmad participated in the 6th PGRP programme (8th - 9th November, 1997) and ~~chaired a session~~ / presented a paper entitled "A Comparative Evaluation of the effects of oral diazepam, Lorazepam and Alprazolam pre medication on arterial blood gases"

Prof. Mehraj-ud-Din
(Patron)

Prof. Zubaida Jeelani
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DIRECTORATE OF HEALTH SERVICES
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No:-Est-3/1-133/ 3531 Dated:- 10-3-98

Certified that Dr.Mir Bashir Ahmad, Assistant Surgeon is working the Health Department of J & K Govt. since 28-1-88. He has served at the following places:

1.	A/D Mohra (Uri)	28-1-88 to 25-9-89
2.	Jr.Resident S.K.I.M.S. Srinagar	27-9-89 to 8-11-91
3.	On leave	9-11-91 to 16-11-92
4.	D.H.Baramulla	17-11-92 to 12-7-93
5.	P.G.(M.D) Student S.K.I.M.S.Srinagar	13-7-93 to 15-7-96
6.	Sr.Resident SKIMS,Sgr.	16-7-96 to 10-12-96
7.	Sr.Resident SKIMS,Sgr.	11-12-96 to date.

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