IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)
e-ISSN: 2279-0853, p-ISSN: 2279-0861.Volume 14, Issue 11 Ver. III (Nov. 2015), PP 56-60
www.iosrjournals.org

To Evaluate the Role of Inj. Ketamine (0.3mg/Kg) Intravenously, Before Skin Incision for Laparotomies under General Anaesthesia as a Pre – Emptive Analgesic, Compared To Normal Saline -A Prospective Randomised, Controlled and Double Blinded Study

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Abstract:
Background: *The role of inj. Ketamine i.v. as a pre-emptive analgesia for laparotomies under general anaesthesia before giving skin incision.*
Aim: *To evaluate the role of inj. Ketamine (0.3mg/kg) intravenously, before skin incision for laparotomies under general anaesthesia as a pre –emptive analgesic, compared to normal saline. "-A prospective randomised, controlled and double blinded study*
Methods: *The study was carried out in Guntur medical College and Government General Hospital. Guntur .After approval from the medical ethics committee, 50 patients of either sex posted for laparatomies under general anaesthesia were selected. The groups were allocated according to randomization into 2 groups of 25 each . Study group (Ketamine) received intravenous ketamine in the dose of 0.3mg / kg body wt made up to 5 ml with normal saline and placebo (Normal saline) group received 5ml of normal saline pre-incisionally.*
KETAMINE 50%, PLACEBO 50%
Results: *In study group the heart rate was higher in 4 time periods- Pre-incision, 5 minutes after intubation, 15 minutes after intubation, 30 minutes after intubation than placebo group. The systolic blood pressure of all the 4 time intervals in both the study and placebo groups did not show much difference. The diastolic blood pressure of mean values of all the 4 time intervals in both the study and placebo groups did not show much difference. The following parameters, specific to the study were compared between the two groups namely.*
1. Preincisional heart rate and blood pressure in comparision with the postincisional heart rate and blood pressure.
2. Postoperative nausea and vomiting.
3. Pain scores
4. Time for first requirement of analgesia.
i.v. preincisional ketamine has improved the quality of analgesia.
Conclusion: *It can be inferred that ketamine is an effective drug which can be used preemptively in improving the quality of analgesic without much risk of increased complications in laparotomies. Also the extubation and postoperative course is uneventful in the study group.*
Keywords: *inj. ketamine, normal saline, pre-emptive analgesia, time intervals, laparatomies.*

I. Introduction:

According to the International Association for the study of Pain (IASP), pain is defined as "An unpleasant sensory and emotional experience associated with actual or potential damage or described in terms of such damage".

Recent practices of anaesthesia have all over the world taken excellent care of pain relief during surgical procedures. But still post operative pain remains most annoying and unpleasant experience for the patient. Acute post operative pain is a reflection of the various physiological injuries namely the tissue injury, reflex muscle spasm and the associated diseases. It also includes psychological , autonomic and behavioural make up of an individual.

II. Pre-Emptive Analgesia:

Definition: Pre-emptive analgesia has been defined as anti-nociceptive treatment that prevents the establishment of altered central processing ,which amplifies post operative pain.
The drugs used in the previous studies are intravenous opioids , non steroidal anti inflammatory drugs, dextromethorphan, peripheral local anaesthetics and epidural analgesics. Recently ketamine has gained importance as the drug of choice in pre-emptive analgesia.

AIM:

To know the efficacy of Intravenous Ketamine as a pre-emptive analgesic in laparotomy surgeries under general anaesthesia.

III. Materials And Methods:

The study entitled on **"To Evaluate The Role Of Inj.Ketamine (0.3mg/Kg) Intravenously, Before Skin Incision For Laparotomies Under General Anaesthesia As A Pre–Emptive Analgesic, Compared To Normal Saline. "-A Prospective Randomised, Controlled And Blind Study**.carried out in Guntur Medical College and Government General **hospital**. Guntur. After approval from the medical ethics committee, 50 patients of either sex posted for laparotomies under general anaesthesia were selected.

Inclusion Criteria:

- ASA I & II.
- Patients aged 18 to 48 years.

Exclusion Criteria:

- ASA III and IV.
- Co- existing psychiatric illnesses.
- Drug or alcohol abuse .
- Chronic pain syndromes.
- Patients with known allergies to the drug

Pre Anaesthetic Assessment And Preperation: A complete history and consent was taken .Routine Investigations were prescribed.

Preparation Of The Patient:

The patients were informed about the mode of anaesthesia and an informed written consent was obtained. Nil per oral orders were given from 10 pm the previous night .The patients thus prepared were brought to the operation theatre on the day of surgery and the base line parameters were noted . No premedication was given to ensure that the pain score in the study was not influenced by the use of analgesic or sedative premedication .

The anaesthesia machine was checked and all the emergency drugs were kept ready if the need would rise. Appropriate size intravenous cannula was inserted and secured. An intravenous fluid was started and kept on maintenance till the patient was induced

Technique/ Protocol: Patient was shifted onto the operation table and preoxygenated with 100% oxygen at the rate of 8 litres/min , after ensuring correct intubation position by placing a head ring beneath. Following a standard protocol the patient was induced with:

- Injection Midazolam 0.05 mg/kg IM,
- Injection Glycopyrrolate 0.005 mg/kg IV,
- Injection Fentanyl 2 micrograms / kg IV.

Induction and intubation wtih :

- Injection Thiopentone sodium 5 mg/kg IV,
- Injection Suxamethonium 1.5 mg /kg IV, Pts intubated and tube fixed at Rt angle of mouth after bilateral auscultation.

After positioning of the patient and before skin incision Ketamine 0.3 mg /kg body wt was given after diluting with saline to 5 ml. (study group) (OR) Pre incision normal saline 5 ml was given (placebo group) in accordance with the randomization .

Heart rate , blood pressure , peripheral oxygen saturation , were monitored every 5 minutes up to initial 15 minutes. Anaesthesia was maintained with oxygen and nitrous oxide. Lungs were mechanically ventilated and at the end of the surgery patients were reversed with the injection Glycopyrrolate 0.01 mg/kg and injection Neostigmine 0.05 mg/kg. Patients were extubated successfully and kept in the post anaesthesia care unit for a period of 1 – 2 hours for observation and pain score and then sedation score were elicited. The pain scores are elicited at zero hours (at the time of receiving the patient in PACU) and at 2 hours, 4 hours, 6 hours , 12 hours and at 24 hours thereafter .

Pain score was assessed using Numerical rating scale (NRS).

0	1	2	3	4	5	6	7	8	9	10
No Pain	Just Noticeable	Mild pain	Un Comfortable pain	Annoying Pain	Just bearable	Moderate pain	Strong pain	Severe pain	Horrible pain	Worst pain

Sedation score was subsequently assessed by WILSONSCORE.

The presence of nausea and vomiting (PONV) , emergence delirium, and psycho-mimetic effects were noted post operatively .

IV. Results:

The statistics done by SPSS soft ware and results were evaluated and interpreted by the student 't' test and chi-square test .

Age Distribution: In the study group the age group is 18 to 48 years. Mean age group is 33.64. S.D is 6.156. In the placebo group the mean age is 33.12 years with a S.D is 7.473. The P value obtained was not statistically significant in both the groups studied. It was 0.789. ($p<0.05$).

Sex Distribution: In study group had 14 male patients(56%) and 11 female patients (44%). The placebo group had 16 male patients (64%) and 9 female patients.(36%). There was no statistical significance noted between the two groups. The 'p' value got was 0.773 ($p < 0.05$) . Hence the two groups are comparable.

Heart Rate:

GROUP	N	Mean	Std. deviation	Std. Error Mean
HR.PREINCISION STUDY GROUP	25	87.60	8.79	1.758
PLACEBO GROUP	25	81.00	7.34	1.468
HR.5 MINUTES STUDY GROUP	25	86.48	11.11	2.222
PLACEBO GROUP	25	77.24	8.95	1.790
HR.15 MINUTES STUDY GROUP	25	84.44	11.73	2.346
PLACEBO GROUP	25	76.20	13.16	2.632
HR 30 MINUTES STUDY GROUP	25	83.64	12.54	2.508
PLACEBO GROUP	25	76.44	8.93	1.786

Systolic Blood Pressure:

Time interval	P value
Pre-incision	0.426
5 minutes	0.149
15 minutes	0.125
30 minutes	0.402

There was no statistically significant difference found between the two groups (p value>0.05).

Diastolic Blood Pressure:

Time interval	P value
Pre-incision	0.4799
5 minutes	0.950
15 minutes	0.184
30 minutes	0.205

There was no statistically significant difference found between the two groups and hence both the groups were comparable with respect to diastolic blood pressure of patients(p value>0.05).

GROUP	N	Mean	Std. deviation	Std.Error Mean
DBP.PREINCISION STUDY GROUP	25	78.00	6.4031	1.280
PLACEBO GROUP	25	76.64	7.088	1.417
DBP.5 MINUTES STUDY GROUP	25	75.84	9.163	1.832
PLACEBO GROUP	25	75.68	9.031	1.806
DBP.15 MINUTES STUDY GROUP	25	77.20	8.246	1.649
PLACEBO GROUP	25	74.80	9.073	1.814
DBP.30 MINUTES STUDY GROUP	25	78.56	7.648	1.529
PLACEBO GROUP	25	75.60	8.621	1.724

Pain Scores-Nrs:

Table shows the statistical analysis of the pain scores at 6 different time periods. At Zero hours, 2 hours, 4 hours, 6 hours, 12 hours, 24 hours in both the study group and placebo group. The pain scores were measured by Numerical Rating Scale. Significant value was taken to be above 4/10.

	GROUP	N	Mean	Std.Deviation	Std.Error Mean
0 HRS	STUDY GROUP	25	2.08	1.823	0.364
	PLACEBO GROUP	25	3.92	1.823	0.364
2 HRS	STUDY GROUP	25	2.60	0.957	0.191
	PLACEBO GROUP	25	4.12	1.786	0.357
4 HRS	STUDY GROUP	25	3.00	0.912	0.182
	PLACEBO GROUP	25	4.16	1.491	0.298
6 HRS	STUDY GROUP	25	2.96	0.789	0.157
	PLACEBO GROUP	25	3.96	1.368	0.273
12 HRS	STUDY GROUP	25	2.60	1.040	0.208
	PLACEBO GROUP	25	3.52	1.584	0.316
24 HRS	STUDY GROUP	25	3.52	1.154	0.230
	PLACEBO GROUP	25	2.44	0.960	0.192

At Zero Hours:

The pain score at zero hours on receiving the patient to the Post Anaesthesia Care Unit(PACU) was significant statistically. This was observed in the study group.

At 2 Hours Group:

At 2 hrs postoperatively no patients in the study group had any complaints of pain. But it was observed that still 9 patients (36%) in the placebo group had pain. Hence the statistical analysis showed that the persistence of pain in the placebo group was significant. The p value being 0.0004 .

At 4 Hours Group:

At 4 hours postoperatively no patients in the study group had any complaints of pain. But it was observed that 8 patients in the placebo group had pain.

At 6 Hours Group:

At 6 hours postoperatively no patients in the study group had any complaints of pain. But it was observed that still 6 patients(24%) in the placebo group had pain.

At 12 Hours Group:

At 12 hours postoperatively none of the patients in the study group had pain but 4 patients(16%) in the placebo group still had pain.

At 24 Hours Group:

At 24 hours there is no difference in the pain scores were noticed in both the study group and the placebo group. No significance was noted.

Analgesic Requirements In The First Hour:

The analgesic requirement and the time to the first requirement of analgesic is statistically significant in our study. In the study group only 3 patients (12%) required analgesic in addition in the first hour of their stay in the Postoperative Anaesthesia Care Unit (PACU).Where as in the placebo group a total of 14 patients (56%) required additional analgesics in the first hour of their PACU stay. The p value obtained was 0. 00068.($p<0.05$) which is statistically significant for our study.

V. Discussion:

Preemptive analgesia is a treatment that is initiated before and is operational during the surgical procedure in order to reduce the physiological consequences of nociceptive transmission provoked by the procedure. Owing to this 'protective' effect on the nociceptive pathways, pre-emptive analgesia has the potential

to be more effective than a similar analgesic treatment initiated after surgery. Consequently, immediate postoperative pain may be reduced and the development of chronic pain may be prevented.
The main finding of this study shows that preemptive intravenous low dose ketamine decreased postoperative pain in patients undergoing appendicectomies. **Aida S, Yamakura T., Pre emptive analgesia with low dose intravenous ketamine with epidural morphine in gastrectomy patients. Anaesthesiology.2000;92;1624-23[1].**

Ketamine is a well known general anesthetics and short acting intraoperative analgesic in use for almost 4 decades . In our study, the study group received ketamine in a dose of 0.3 mg/kg and placebo group received normal saline and low doses of ketamine act as an analgesic agent .

Fu ES, Miguel R et al[2]., A study conducted to determine if preemptive administration of systemic ketamine decreases postoperative pain This is in accordance with our study which showed low pain scores and decreased postoperative analgesic requirement.

Gilabert MA, Sanchez PC[3] .,study shows the similar effects were found in cases of hysterectomies and adnexectomies. Preemptive doses of ketamine with 0.3 mg/kg given intravenously , with placebo as the control group, which showed opiod Royblatt L et al. In their study they have reported a decrease in the incidence of psychomimetic phenomenon when ketamine is used in conjunction with the sedatives, hypnotics, general anaesthetics and benzodiazepines. All these factors are observed in our study.
Schmid et al[4]., concluded that ketamine is effective analgesic in postoperative surgical patients. Ketamine has analgesic properties that is mediated by a number of mechanisms. This is in accordance with the reports by Ghazi Saidi and Hajipore-where they studied the effects of ketamine on post-caesarean analgesic requirements. They stated that addition of low dose ketamine to general anaesthesia before induction in caesarean patients delays the first request for opioid from 2hrs to 10 hrs. Therefore in present study, we used 0.3 mg/kg of ketamine preincisionally in laparotomy procedures, where in direct effect of analgesic would last only for about 15 minutes. But what was observed was reduction in pain for much more than prolonged period and reduction inoverall analgesic requirement in the first 24 hours.
In a meta analysis by **Cliff and Jenkins et al[5]**,the following outcomes were studied.
1. Pain intensity in the form of various pain scores Visual Rating Scale, Numerical Rating Scale and Visual Analogue Scale during the first 24-48 hours.
2. Supplemental postoperative analgesic requirements
3.Time for first rescue analgesic

Preemptive analgesia showed an overall beneficial effect in all three variables, this is in accordance with the reports by **Ghazi Saidi and Hajipore[6]**-where they studied the effects of ketamine on post-caesarean analgesic requirements. They stated that addition of low dose ketamine to general anaesthesia before induction in caesarean patients delays the first request for opioid from 2hrs to 10 hrs. Our study on preemptive ketamine has thus satisfied all the outcomes and has proved ketamine to be a effective as an preemptive analgesic.

VI. Conclusion:

It can be inferred that ketamine is an effective drug which can be used preemptively in improving the quality of analgesic without much risk of increased complicationsin laparotomies. Also the extubation and postoperative course is uneventful in the study group.

Bibliography

[1]. Aida S, Yamakura T., Pre emptive analgesia with low dose intravenous ketamine with epidural morphine in gastrectomy patients. Anaesthesiology.2000;92;1624-23
[2]. Fu ES, Miguel R., Preemptive ketamine decreases postoperative narcotic requirements in patients undergoing abdominal surgery. Anaesthesia Analgesia1997: 1086-90.
[3]. Gilabert MA , Sanchez PC., Effect of low dose intravenous ketamine in postoperative analgesia for hysterectomy and adnexectomy. Rev Esp Anestesiol Reanim. 2002;49: 47-253.
[4]. Schmid et al., Ketamine is an effective analgesic in post operative surgical patients. Ketamine has analgesic properties that is mediated by a number of mechanisms (Pain .1998;82:111-25).
[5]. Cliff,jenkins.postoperative pain and anaelgesia required with Ketamine. Anaesthesia analgesia.2005;100:757-77.
[6]. Ghazi al Saidi, Hajipur etal. Effects of preemptive Ketamine on post caesarean analgesic requirement. Acta Medica Iranica. 2002,Vol 40.