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RESEARCH ARTICLE

A COMPARATIVE STUDY OF CAUDAL BLOCK USINGLIGNOCAINE ALONE AND WITH KETAMINE FOR ADULTANORECTAL SURGERIES

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Abstract

Background -we want to compare the effects of lignocaine alone & lignocaine with ketamine in the caudal block for anorectal surgeries

Methods- A prospective, randomized, comparative study was conducted at the Department of Anaesthesiology, ACSR Govt Medical college on 50 ASA I, and II patients aged between 18 to 60years posted for elective anorectal surgeries, during the period of November 2020 to February 2022**,**by dividing the patients into two groups

Results-In this study the mean time to the first analgesia was 7.9 min. in the control group and 5.6 in the study group ($p < 0.05$). The mean time to start was 13 min. in the control and 11 min. in the study group ($p < 0.05$). The sensory block level reached in the control group was T12 and in the study group was T 10. The motor blockade was significantly less in the study group than in the control group ($p < 0.05$). Anal sphincter relaxation was better in the study group than in the control group. The discomfort caused by the awkward positioning was less in the ketamine group than in the control. In the study group, patients had acceptable sedation which contributed to a sense of well-being superior patient satisfaction and better working conditions for surgery. Both groups were compared in the incidence of intraoperative and postoperative complications. In the study group the total duration of analgesia was significantly prolonged (210 min. vs. 247 min. p value <0.05) There was no hypotension in the study group whereas in the control group there

was a mean fall of 4 mm Hg. in the systolic BP. The addition of Ketamine in the subanaesthetic dose of 0.5 mg / Kg to the Caudal epidural block

provides comparatively better anaesthesia than Lignocaine alone.

Conclusion- We concluded that Caudal Epidural Block (CEB) using Lignocaine 30 ml with Adrenaline (1 in 200 000 dilutions) is a safe, reliable and simple technique that can be practised for this kind of surgery. Ketamine as an adjuvant in sub anaesthetic doses significantly improves the quality,duration, and patient comfort in the caudal block.

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Introduction:-

Anorectal surgeries are done under General anaesthesia, Regional anaesthesia, or local block, each has its own advantages and disadvantages. Proper patient selection is essential for the success of each of these methods. Nevertheless the advantages like a predictable level of blockade depending on the dose of drug,haemodynamic stability, possibility of producing the selective block in the anorectal area without producing the motor blockade in the legs (and consequent ambulation soon after surgery) absence of Post dural puncture headache, Prolonged post op analgesia using longer acting local anaesthetic drugs and adjuvants have stimulated interest in the caudal epidural technique in recent times

Studies using Ketamine as a sole anaesthetic agent in Paediatriccaudals are being published. But in the adult population, the results are not consistent. Some studies concluded that Ketamine prolonged the duration of anaesthesia while some other studies failed to confirm this.

This study was conducted by the Department of Anaesthesiology ACSR Govt Medical college,Nelloreto study the effects of a subanaesthetic dose of Ketamine in a caudal epidural block using Lignocaine. This study conducted on 50 adult patients coming for anorectal surgeries, shows that Adult Caudal block is a safe, efficient and simple technique for anorectal surgeries. It also shows that the additionof ketamine to lignocaine did prolong the duration of the anaesthesia and significantly increased the quality of the sensory block. The caudal blocks are particularly well suited for daycare surgeries whereearly ambulation and lack of post-operative complications are major concerns.

Aims And Objectives Of The Study:-

1. To study the characteristics of Caudal epidural block in adult anorectal surgeries
2. To study the effect of adding Ketamine as an adjuvant to Caudal epidural block.
3. To determine the suitability and safety of Caudal epidural block for adult anorectal surgeries.

Materials and Methods:-

Materials:-

1. Lignocaine - 1.5%
2. Preservative free Ketamine
3. 22-gauge needle
4. Glass syringe -10 ml.
5. Povidone Iodine
6. Spirit
7. Sterile drapes, gloves

Methods:-

After getting the Hospital Ethical committee's approval, 50 ASA 1 and 2 patients were enrolled on the study, after their consent.

They were divided into two groups of 25 each. One group which received 1.5% LIGNOCAINE (30 ml) with Adrenaline (1 in 200 000) caudally served as the CONTROL group. The other group which received Ketamine (0.5 mg / Kg) in addition to Lignocaine (1.5 %) – 30 ml and Adrenaline (1 in 200 000) served as the STUDY group.

Inclusion Criteria:

1. Sex: Male and Female.
2. Age: Between 18 to 60 years.
3. ASA status: I and II
4.Patients posted for elective anorectal surgeries surgery

Exclusion Criteria

1.Patient refusal
2. Patients with uncontrolled hypertension
3. Patients with cardiovascular disease,
4. Patients with Neurological disease,
5. Patients with morbid obesity,

6. Patients with psychological disorders, endocrine disorders

Premedication:
All the patients were premedicated with Inj Midazolam 1mg and inj.Atropine 0.6 mg in the morningfor 45 min. prior to the surgery.

The procedure was explained to the patients and their doubts cleared.

Position:
The patient was put in a semi-prone position.

Procedure:-

Prior to shifting to the operation table, the anatomical landmarks were palpated. On the table after putting the patient in a semi-prone position thorough painting with Povidone Iodine solution and after that with Surgical Spirit was carried out. Sterile drapes were used to expose the sacral landmarks.Once again the anatomical landmarks were examined by inspection as well as palpation.After confirming the position of the sacral hiatus by palpating the cornua, using a smaller gauge needle intradermal infiltration of local anaesthetic solution around the hiatus was done. Using a 22gauge needle, at an angle of 90 degrees to the skin, the sacrococcygeal membrane was pierced. The subtle givea way of the needle as it pierced the Sacro-Coccygeal Membrane was appreciated. After that the needle was lowered to 60 degrees towards the coccyx and advanced to a further few centimetresnever going beyond 4 cm. Loss of resistance to air was used to confirm the epidural space. Also, WHOOSHTEST[4] was performed by placing the stethoscope over the lumbar spines. After confirming with the abovementioned methods and aspirating for any CSF or Blood a test dose of 2 ml of the local anaestheticsolution was injected and waited to see any untoward reactions. The pulse rate was monitored continuously, and the patient was asked to move the great toe. After confirming that the drug has not entered the Subarachnoid space or into a Vein the remaining dose of the drug was injected with all the monitoring. Attention was paid to see for the development of subcutaneous swelling. Ease of injection of the drug was noted. After the successful injection of the drug patient was turned to the supine position. After 5 minutes perineal sensation was tested for temperature and touch. In case of successfulanaesthesia of the perineum, the sensory level of the blockade was assessed and immediatelylithotomy position was put and surgery started. In case of poor anaesthesia of the perineum, a few more minutes of waiting were done testing for anaesthesia every minute. If there was no anaesthesia or poor anaesthesia even after 20 minutes, with the patient able to recognize pinprick, the caudal block was adjudged as failed and other methods of anaesthesia such as Subarachnoid block or General anaesthesia were resorted to.

Monitoring:
1. Continuous pulse rate and waveform
2. Blood Pressure
3. Pulse Oximetry
4. Continuous ECG
5. Wakefulness

Subjective Information:
In addition to the above-mentioned objective data, subjective data were collected from the surgeon and the patient. The surgeon was asked to compare the sphincter relaxation produced in the caudal block and spinal
anaesthesia. The surgeon has to term it as bad, good and excellent. Numerical scores were given for each of these qualitative terms. He was also asked about his satisfaction with the surgical conditions produced. Thatwas also grouped under bad, good and excellent and given numerical values accordingly. The patient was also asked to characterize his experience as bad, good and Excellent. Numerical values were given for each of these accordingly.At the end of the surgery patient's wakefulness was tested.His haemodynamic status was noted and shifted to post anaesthesia care unit and then to the ward.

Results And Observations:-

The following parameters were observed:
1. Time to first appearance anaesthesia
2. Time to start surgery

3. Sensory dermatome level
4. Muscle power in the lower limbs
5. Presence of pain due to lithotomy position
6. Anal sphincter relaxation
7. Sedation score
8. Intraoperative complications
9. Patient satisfaction level
10. Surgeon satisfaction level
11. Post op analgesia time
12. Post-operative complications
13. Hypotension during surgery

Results:-

Statistical analysis was carried out by Student t-test (the mean value of control and test groups in each parameter studied).

Of the 50 cases studied, there were 2 failures. The failure rate is 4% in this study. This is mainly because of not appreciating the sacral landmarks.

Gender:

Group	Male	Female
Control	22	3
Study	21	4

The control and study groups are comparable regarding gender distribution.

Age: From 18 years to 60 years
The median age is 33.5 years

Group	Mean age
Control	34.9
Study	37

Both the groups are comparable in age distribution.

Weight: The average weight of the patient is 52.04 Kg.
Range: 38 - 70 Kg.
Median: 50 Kg.

Group	Mean weight
Control	50.5
Study	52.4

Surgery:

Type of surgery	Number of cases
Hemorrhoidectomy	29
Fistulectomy	14
Lat. sphincterotomy	7

Duration of surgery:
Mean duration of surgery: 42.75 min.
The median duration of surgery: 29.75 min.
Range: 20 – 60 min.

Group	Mean duration of surgery

Control	40
Study	45.8

Mean time to onset of anaesthesia:
Control group - 7.9 min.
Test group - 5.6 min.
'p' value < 0.05

	Number	Mean	S.D
Control	25	7.913043478	3.06605
Test	25	5.6	2.1725
S.E(d)			0.772990
Difference		2.31304	

Mean Time to start surgery:

	NUMBER	MEAN	S.D
CONTROL	25	13.0434	3.2097
TEST	25	11.04	1.84347
S.E(d)			0.76411
Difference		2.0034	

Control group - 13.04 min.
Test group - 11.04 min.
'p-value< 0.05
Mean sensory dermatome block level:

	NUMBER	MEAN	S.D
CONTROL	25	11.913	0.717
TEST	25	10	0.56568
S.E(d)			0.18749
Difference		1.91304	

Control - T 12
Test - T 10
'p-value< 0.05

Mean muscle power in the lower limb:

	NUMBER	MEAN	S.D
CONTROL	25	4.0435	0.4642
TEST	25	4.52	0.64
S.E(d)			0.0258
Difference		0.4765	

Control- 4.04
Test - 4.52
'p-value< 0.05
Mean sphincter relaxation score:

	NUMBER	MEAN	S.D
CONTROL	25	1	0
TEST	25	1.8	0.4
S.E(d)			0.08
Difference		0.8	

Control - 1.0

Test - 1.8
'p-value< 0.05

Mean positional pain score:

	NUMBER	MEAN	S.D
CONTROL	25	0.13043	0.33678
TEST	25	0.04	0.03919
S.E(d)			0.279395
Difference		0.09043	

Control - 0.13
Test - 0.04
'p-value is not significant

Mean sedation scores:

	NUMBER	MEAN	S.D
CONTROL	25	1.95652	0.20393
TEST	25	3.12	0.58787
S.E(d)			0.12502
Difference		1.16347	

Control: 1.95
Test: 3.12
'p-value< 0.05

Mean Surgeon satisfaction score:

	NUMBER	MEAN	S.D
CONTROL	25	1.174	0.3790
TEST	25	1.8	0.4
S.E(d)			0.29229
Difference		0.62608	

Control: 1.17
Test: 1.8
'p-value< 0.05

Mean patient satisfaction score:

	NUMBER	MEAN	S.D
CONTROL	25	1	0
TEST	25	1.84	0.91022
S.E(d)			0.18204
Difference		0.84	

Control: 1
Test: 1.84
'p-value< 0.05

Mean time to the perception of post-op pain:

	NUMBER	MEAN	S.D
CONTROL	25	210.22	49.0105
TEST	25	247.6	38.9134
S.E(d)			12.84545
Difference		37.383	

Control: 210.21 min.
Test: 247.6 min.
'p'value<0.05

Postoperative complications:
There were no cases of postoperative complications.

Hypotension:

	NUMBER	MEAN	S.D
CONTROL	25	4.34782	6.47808
TEST	25	0	0
S.E(d)		4.34782	1.357
Difference		6	

Control - 4.347
Test - 0
'p-value< 0.05

Discussion:-

The results confirm the findings of various other studies about the safety and simplicity of caudal epidural block for anorectal surgeries. It is very important to note that, of all the patients who underwent caudal block, none of them had any serious intraoperative and postoperative complications. The failure rate also is quite comparable to other regional techniques, if we consider that the experience of the anaesthesiologist is very much limited. The failure rate of 4% found in this study is similar to GeorgadzeA K et al[1]. in their study of sacral epidural block for acute proctitis cases. They had a failure rate of 3.6%. PolushinIuS et al[2]. found a failure rate of 5.2%. The time to onset of anaesthesia and time to start surgery is quite superior to that ofthe subarachnoid block. Caudal Epidural gives a predictable and adequate level of anaesthesia (particularly with Ketamine additive – up to T 10 level) so that anorectal surgeries can be done safely and pleasantly.

In our study, the pressure when the anus was contracted will fall significantly further in the caudal group than in the lumbar group. These results suggest that caudal anaesthesia should be utilized for obtaining full muscle relaxation of the anal area in a short time compared with lumbar epidural anaesthesia,our results match with Takahashi R et al[3]

The addition of Ketamine in the subanaesthetic dose of 0.5 mg / Kg to the CEB enhances the quality and patient perception of the procedure while not increasing the adverse effects. There is a 2-minute advantage in the time to onset of anaesthesia and time to start surgery in the test group compared to the control. The addition of Ketamine to the Lignocaine gives consistently good sensory block level when compared to Lignocaine alone (T 10 vs. T 12). It also fulfils the recommendation that at least a T10 level of sensory block is essential to avoid sympathetic stimulation and the resultant discomfort to the patient. The mean muscle power is significantly higher in the Ketamine group when compared to the control. This can be due to sensory block attained early in the ketamine group before the onset of motor block. The mean anal sphincter relaxation score was significantly higher in the ketamine group.

The mean positional pain score is significantly lower in the ketamine group compared to the control group. But it should be noted that none of the patients described positional pain as bad.. Our study results match with the study of Marhofer P, et al[5,] regarding surgical & postoperative anaesthesia with ketamine. Patients in the Ketamine group were sleeping in and responding to the commands. The mean patient and surgeon satisfaction scores were higher in the Ketamine group as the sub-anaesthetic dose provides better patient well-being and so superior operating conditions by providing sleep, less positional discomfort, good sphincter relaxation and fewer patient movements. PolushinIuS et al[2]. found in their study that lignocaine caudal epidural block provides an analgesic duration of 3 +/- 0.5 hours. Our finding also confirms this. In our study, the total analgesic effect of Lignocaine alone was 3 hours 20 min (mean). The addition of Ketamine prolongs this duration by about 37.6 minutes. This is a significant effect exerted by ketamine ($p < 0.05$). In the Ketamine group, the incidence of hypotension has never occurred whereas in the control group there was a mean fall of 4.3 mm of Hg.

Conclusion:-

This study conducted on 50 adult patients coming for anorectal surgeries has shown that caudalEpidural Block (CEB) using Lignocaine 30 ml with Adrenaline (1 in 200 000 dilutions) is a safe, reliable and simple technique that

can be practised for this kind of surgeries.Ketamine as an adjuvant in sub anaesthetic doses significantly improves the quality, duration and patient comfort in the caudal block.

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