

Evaluation of Efficacy of Intrathecal Pentazocine as a Sole Anaesthetic Agent for Lower Abdominal Surgeries

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I. Introduction

The relief of pain during surgery is the *raison de tre* of anaesthesia. Now from the intraoperative relief of pain, anaesthesiologist's work has extended on to postoperative pain relief, relief of chronic pain and cancer pain.

The above purpose is achieved by means of the use of different combination of drugs administered through various routes. Among the regional anaesthetic techniques spinal anaesthesia has a special place as it is a very simple procedure to perform and it is a more definite procedure and has a high success rate. In the recent past from alleviating pain intraoperatively it has extended its analgesic effect in the postoperative period also. Local anaesthetics are used commonly for spinal anaesthesia. But there are so many drawbacks when we use local anaesthetics alone, as they don't provide extended postoperative pain relief if used as a bolus. So a search for an alternate agent for spinal anaesthesia was on. In 1973 Pert and Synder discovered opioid specific receptors in the substantia gelatinosa of spinal cord and paved the way for the use of intrathecal opiates leading to a new era of pain relief. Wang et al in 1979 first applied intrathecal opiates for relief of pain.

Providing a good postoperative pain relief will reduce the postoperative morbidity, allows early ambulation and early discharge. So an opioid which is used as a sole anaesthetic agent has proven to provide adequate surgical anaesthesia without much hemodynamic compromise. In this study the drug Pentazocine is tried and its efficacy is evaluated.

II. Methods

It was a randomized single blinded study. The patients posted for elective lower abdominal surgery were chosen at random. All the 75 patients belonged to ASA risk 1 and 2 with age distribution between 18-60 years. After obtaining approval from the ethical committee and written informed consent from the patients the study was conducted. The exclusion criteria included patients belonging to ASA 3 and 4, spinal deformities, local skin sepsis, bleeding disorders and psychiatric illness.

Preanesthetic assessment included system examination and relevant investigations. Preoperative counseling and reassurance was given to all patients. No premedication was given.

The drug used was preservative free pentazocine lactate 3 percent. In the operation theatre after recording baseline, pulse rate, blood pressure and respiratory rate, an intravenous line was started with dextrose normal saline. Following resuscitative measures were kept ready before administering spinal anaesthesia. Boyles machine with O₂ source, laryngoscope and appropriate size ET tubes, suctioning apparatus, vasopressors, all other emergency drugs.

Lumbar puncture was performed under strict aseptic precautions with the patient in right lateral position with 22 or 23 gauge needles at L3-L4 interspace. After obtaining free flow of cerebro spinal fluid, injection pentazocine lactate 1-1.5mg/kg was injected. After the injection the patient was placed in supine position. The sensory blockade was assessed every 30 seconds for the first 5 minutes. Then every 1 minute till final level is achieved using pinpricks. Motor blockade was assessed by Bromage scale and time taken for grade 3 motor block noted down.

Bromage Scale (0- No Paralysis, 1- Inability to raise the extended leg, 2- inability to flex the knee joint, 3- Inability to flex the ankle joint). During surgery pulse rate, BP, respiratory rate were noted every five minutes. A fall of systolic pressure by 20% from the baseline value was taken as hypotension and managed with O₂, IV fluids and injection ephedrine incremental doses if needed. Bradycardia if occurred treated with injection atropine in incremental doses.

At the end of surgery patients were asked to mark a point in the visual analog scale according to the intensity of pain. The observation was done every hour. The pain relief was graded according to visual analog pain scoring as follows, 0-1 – Excellent, 1-4 – Good, 4-6 – Fair, 6-8 – Poor, 8-10 – No relief. The duration of analgesia was taken as the period from the time of giving subarachnoid block till the patients first requirement of systemic analgesic medication. Visual analog pain scoring more than 6 were given supplementary analgesia.

Sedation level was assessed for every hour and graded according to sedation score(Brain and ready) 0-Fully awake, 1-Normal sleep, 2-Drowsy, arousable on touch, 3-Drowsy, arousable to painful stimulate, 4-Somnolent. The side effects like nausea, vomiting, pruritis, urinary retention were noted down.

III. Results

A total of 75 patients were included in the study. Out of them 68 were females and 7 were male patients. Most of them underwent gynaecological procedures like abdominal hysterectomy, vaginal hysterectomy with pelvic floor repair. Parameters evaluated are in table 2.

Patient profile

Table 1

A	G	E	4 2 . 8	\pm 1 2 . 4 8	y r s
S	E	X	(M / F)
7	:	6	:	8	
W	E	I	G	H	T
5 0 . 7	\pm	4 . 8	k g s		
T Y P E			O F S U R G E R Y		
			Abdominal hysterectomy - 24		
			Vaginal hysterectomy - 44		
			Hernioplasty-7		
DURATION OF SURGERY			2 h r 1 3 m i n \pm 3 6 m i n		

Parameters

Table 2

Time of onset of sensory blockade at T10	2 . 2 9	\pm 1 . 0 1	m i n		
Time of maximum level of block	3 . 4 4	\pm 1 . 0 3	m i n		
Maximum level of block	1 . 5 m g / k g	-	1 6 1 m g / k g	-	T 1 0
Motor block (Grade 3)	4 . 2 4	\pm 1 . 0 4	m i n		
2 Segment regression time	1 0 3 . 2 5	\pm 1 1 . 2 2	m i n		
Duration of postoperative analgesia	2 1 . 6 5	\pm 8 . 7 8	h r s		
Quality of analgesia	Excellent-15 Good - 40 Fair-18 Poor-2				
Sedation	Score 1 in 7 5 p a t i e n t s				

Complications

Table 3

Hypotension	7	
Bradycardia	1	
Nausea and vomiting	1	5
Respiratory depression and pruritis	N	i
Headache	1	

IV. Discussion

Ever since the opioid receptors were identified in 1973 attempts were being made towards the use of various opioids epidurally and intrathecally for analgesia as indicated by Leonkoffman on principles of intrathecal and epidural opioids. Intrathecal administration is technically easy and it provides better and long analgesia with minimal side effects due to specific action on opiate receptors. It acts on the small primary afferents in substantia gelatinosa and inhibits them. They alternate the release of substance P. Motor blockade is partly due to their effects of opiate receptors in ventral horn partly due to their action in axonal membrane.

Once introduced into cerebrospinal fluid the tertiary amine group of the opiate at pH 7.4 dissociates and the drug now gains entry into the axonal membrane of the spinal nerve roots and should block the nerve conduction similar to local anaesthetics. The present study proves the efficacy of Pentazocine as spinal anaesthetic following subarachnoid injection. Sensory and Motor blockade were obtained in all patients. Onset of motor and sensory paralysis was slower.

The axonal blockade produced by Pentazocine in the spinal nerves do not explain the postoperative analgesia noted in the study after recovery of motor block. The duration of analgesia produced by intrathecal pentazocine far exceed the duration of action when administered parenterally. However there was big inter subject variation in this regard. This parallels the large inter individual variations in the plasma and cerebrospinal fluid concentrations of morphine and meperidine by Nord berg et al and Sjostrom et al in various surgical patients when given for postoperative pain relief.

All the clues point towards the interaction of intrathecal pentazocine with opiate receptors which are richly distributed in the posterior horn cells of spinal cord responsible for primary integration of nociceptive impulses and with brain own opiates sedation noticed following intrathecal pentazocine may be due to agonistic action on kappa opioid receptors which are responsible for sedation and spinal analgesia. Hemodynamic stability during surgery was maintained during intrathecal pentazocine with incidence of hypotension 9.33%. Bradycardia was observed in only one patient 1.33%.

Low incidence of complications indicate the rostral spread of pentazocine in the cerebrospinal fluid is minimal and could be attributed to their higher lipid solubility as compared with morphine. There was no respiratory depression as the drug has no effect but rather antagonistic action over μ receptors. Absence of pruritis was remarkable. Nausea and vomiting were seen in the postoperative period in 20% of patients, which responded to Inj. Metaclopramide. Sedation was found in almost all the patients with the sedation score of 1. Headache occurred only in one patient.

V. Conclusion

The study done to evaluate the efficacy of pentazocine as a sole anaesthetic agent for lower abdominal surgeries bears the following results.

1. It produces good surgical anaesthesia for up to 103 min
2. It obviates the need for intraoperative sedation
3. It gives very good postoperative analgesia helping in early ambulation of patients

Pentazocine having local anaesthetic like activity gives sensory and motor blockade for surgeries done below the level of umbilicus and it gives reasonable duration of postoperative analgesia. The commonest side effect was nausea and vomiting which was managed easily. So it can be tried as an alternative to local anaesthetic drugs effectively.

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