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A Comparative Study of Intrathecal Dexmedetomidine Versus Morphine as Adjuvants to Bupivacine in Lower Limb Surgeries.

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INTRODUCTION:

As the rate of increasing of subarachnoid blockade due to its procedural simplicity, low cost and better physiological benefits and thus reduced complications than that of general anaesthesia.

Postoperative pain management is one of the main challenges for anaesthesiologists and even with the help of multimodal analgesia techniques, patients still remain undertreated.[1] . Since no single modality for the post-operative pain relief has proven to be effective without side effects, we continue to explore modern strategies with new drug combinations.[2]

As lower limb surgeries involve traction of peritoneum and intra peritoneal structures giving rise to visceral pain, addition of various adjuvants with local anaesthetics in a subarachnoid block is useful to enhance analgesia. There by improving the quality of recovery & early resumption of normal activities.

Dexmedetomidine is a highly selective α_2 agonist which possesses sedative, analgesic and sympatholytic properties and gives prolonged analgesia when used intrathecally without respiratory depression.[3].It has gained popularity as a neuraxial adjuvants as it provides stable hemodynamic condition, good quality of intra-operative & pro-longed post operative analgesia with minimal side effects.

Intrathecal dexmedetomidine has been found to be ten times more potent analgesic and anaesthetic as compared to intrathecal clonidine and five times more potent than opioids like intrathecal fentanyl.[4],[5] Intrathecal morphine when compared to intrathecal α_2 AR agonist, clonidine proved to be better post-operative analgesic with significantly less rescue analgesic consumption, but the duration of spinal block was more with clonidine than morphine.[6]

Since the isolation of opoids receptors in the spinal cord , administration of intrathecal opoids for surgery has gained wide popularity.

Morphine is a μ receptor agonist opoid,intrathecally exerts its effect by combining with opoids receptors in the dorsal horn of spinal cord and may have a supraspinal spread and action.

AIM :

To compare the onset,duration of sensory & motor block ,post-operative analgesia and adverse effects of dexmedetomidine & morphine when given intrathecally with 0.5% hyperbaric bupivacine in lower limb surgeries**.**

MATERIALS & METHODS:

Its a prospective ,randomized & comparative study was approved by our institutional ethical committee .
After obtaining written informed consent,58 patients of ASA -1 & ASA -2 scheduled for lower limb surgeries under spinal anaesthesia were selected .

Exclusion Criteria were patients refusal ,contraindication for spinal anaesthesia ,body mass index (BMI) more than 35 kg/m^2,history of chronic drug abuse & known allergies to the study drug.

All patients were examined & investigated a day prior to surgery .They were advised fasting for 6 hours , received famotidine 40mg as premedication a night before & 40mg in morning on the day of surgery.

In the operation theatre ECG,Pulse oximetry and non invasive blood pressure were attached and baseline parameters were recorded .The patient was given metaclopromide as aspiration prophylaxis.A fluid preload with 500ml of lactated ringer's solution was carried out over 15 minutes prior to the procedure.

Spinal Anaesthesia was administered with the patient in the sitting position under aseptic technique using 25G quincke's needle at L_3-L_4 interspace.

Patients were randomly divided into the following groups:-

A.Group D to receive 17.5mg of 0.5% hyperbaric bupivacine and 5 µg dexmedetomidine

B.Group M to receive 17.5mg of 0.5% hyperbaric bupivacine with 125µg Morphine .

The intrathecal injection was given over approximately 15~20 seconds.

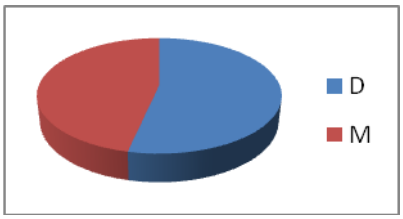
Immediately after completion of the injection patients were made to lie supine position. Oxygen (5L/min) was administered via a mask if the pulse oximeter reading decreased below 92%.

Hypotension defined as a decrease of systolic blood pressure by more than 30% from baseline or a fall below 90mmhg,was treated with incremental I.V doses of ephedrine 5mg and I.V fluid as required .

Bradycardia, defined as heart rate <50 bpm was treated with atropine 0.3~0.6mg .The incidence of adverse effects such as nausea ,vomiting, shivering, pruritus, respiratory depression and hypotension were recorded.

Sensory testing was assessed by loss of pin prick sensation to dermatomes levels were tested every 2 min.Further testing was performed at 20mins intervals until the recovery.Data regarding the highest dermatomes level of sensory blockade,the time to reach this level from the time of injection,time to S1 level level sensory regression ,time to urination and incidence of side effects were recorded.

PATIENTS



The Motor level was assessed according to modified Bromage score [7]:-

Bromage 0: The patient is able to move the hip,knee and ankle .

Bromage 1:The patient is unable to move the hip ,but is able to move the knee and the ankle.

Bromage 2:The patient is unable to move hip,and knee ,but is able to move the ankle.

Bromage 3:The patient is unable to move the hip,knee and the ankle.

Complete motor block recovery was assumed when modified Bromage score was 0.

All durations were calculated considering the time of spinal injection as time zero.

Vitals were recorded 5min before intrathecal injections ;5,10,15,20, and 25 minutes after and subsequently every 15 minutes.

Pain scores using VAS was assessed in the post operative period.

Any patient showing VAS more than or equal to 4 was administered a supplemental dose of I.V tramadol 50mg .The amount required by the patients in the next 24 hours was recorded in all the groups.

RESULT:

All the patients completed the study. There was no significant difference in patients demographics or duration of surgery.We were able to include 31 patients in group D AND 27 in group M respectively.Onset time of sensory block to reach T8 dermatomes was 5.8±2.4 in group D and 5.4 ±3.7 in group M.

The mean time of sensory regression to S1 was 410 ± 23min in group D and 375 ± 12minutes in group M.

Regression time to reach modified Bromage 0 in group D (375±20)was significantly longer than that of group M (325±30), and P value was <0.001 in both groups.

Both the group showed significantly less and delayed requirement of rescue analgesic overall side effects were significantly more in group M.

Nausea /vomiting was more in group M(n=7) than group D (n=0)

Hypotension is mild to moderate in both the groups.

Overall side effects were significantly more in group M than group D.

Demographic Data (mean +/-SD)

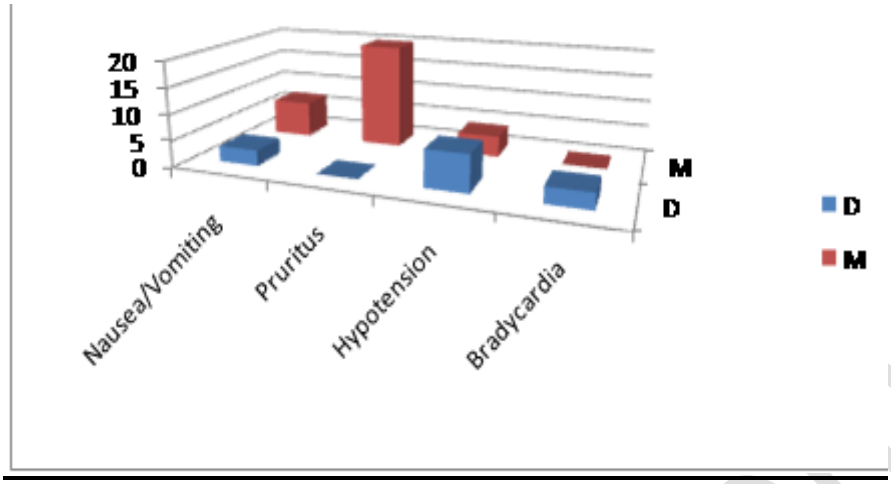
	GROUP D	GROUP M
Age(in Years)	27.5±3.5	29.3±4.9
Weight(kg)	69.5±10	68.3±8.4
Height(Cm)	154.9± 4.8	132.2±2.4
Period of gestations	38.1±0.5	37.9±0.6
ASA 1-2	22.9	25.2

Duration of onset & effect of analgesia(Mean +/-SD)

Analgesic properties	**GROUP M**	**GROUP D**
Duration Of Onset	5.4±3.7	5.8±2.4
Time of sensory regression to S1	375±12	410±23
Time of motor regression to Bromage 0	325± 30	371±20

SIDE EFFECTS:

Side effects	Group D	Group M
Nausea/Vomiting	3	7
pruritus	0	20
Hypotension	7	4
Bradycardia	3	0
Need for intra-operative analgesia	0	0



DISCUSSION:

There Has Not Been a Published Data Comparing Dexmedetomidine & morphine as adjuvants to bupivacine.

There has been many published studies comparing Dexmedetomidine with Fentanyl,Clonidine,etc .Similiarly Morphines has been compared with Fentanyl.

One study found intrathecal dexmedetomidine provides pronged motor and sensory block with haemodyanamic stability and reduced demand of rescue analgesic as compared to intrathecal clonidine and fentanyl.[4]

Different doses of intrathecal dexmedetomidine used as adjuvant to hyperbaric bupivacaine have shown that higher dose of dexmedetomidine was associated with faster onset and slower regression of both motor and sensory block with reduced analgesic requirement in the post-operative period.[8],[9],[10]

In all the cases, Dexmedetomine has been found to be superior to its counter parts , similarly studies have shown morphine to be superior than agent it was compared to. Intrathecal morphine and dexmedetomidine both are known to cause hypotension by action on ARs.[11] In our study, hypotension was seen more frequently in dexmedetomidine group than morphine. We found incidence of pruritus in morphine group was 36% which is comparable to previous studies. Incidence of nausea in Group M was 52% in our study, which is much higher than earlier documentation.[12] Chances of respiratory depression at low doses of intrathecal morphine are negligible which is confirmed by our study.[12],[13]

In our study ,we compared both these drugs and found that though Dexmedetomine and Morphine have similar advantages for their use, but dexmedetomine, due to less adverse effects than morphine, is probably a better alternative. Limitations of the study are low study population and post operative analgesia after 24 hours could not be assessed and we will definitely try to improve in the next study.

CONCLUSION:

Intrathecal dexmedetomidine is associated with prolonged motor and sensory block. Both the group showed hemodynamic stability and reduced demand for rescue analgesics in 24 hours. Morphine was associated with adverse effects like nausea ,vomiting and pruritus. Dexmedetomidine seems to be an attractive alternative as adjuvant to spinal with a drawback of increased duration of motor block which may not be suitable for short term surgical procedures.

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