

Original Research Article

To compare the efficacy of dexmedetomidine and Fentanyl on onset and duration of sensory, motor blockade and duration of analgesia

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Abstract:

Background & Method: The aim of this study is to compare the efficacy of dexmedetomidine and Fentanyl on onset and duration of sensory, motor blockade and duration of analgesia. The present study to compare the analgesic efficacy of Dexmedetomidine and Fentanyl as adjuvant to Levobupivacaine and Ligocaine in PNS guided Supraclavicular Brachial Plexus block" was carried out in Department of Anesthesiology index medical college Hospital and Research centre, Indore M.P. after approval of institutional ethical committee in 60 patients of ASA 1 & ASA II posted for elective upper-limb surgery.

Result: P value < 0.05 was taken as statistically significant. The above table shows the comparison of duration of Analgesia in minutes, duration of sensory block and duration of motor block in minutes. In group B 957.00±259.536 and in group C 594.50 ±64.357. In group B 822.00±158.267 and in group C 522.00 ±57.911.

Conclusion: Group 'B' = given 20 ml of 0.5% Levobupivacaine and 10 ml of 2% Lignocaine with 1 microgram / Kg Dexmedetomidine diluted to the volume of 2 ml NS. (Total volume 32 ml) and Group 'C' = given 20 ml of 0.5% Levobupivacaine and 10 ml of 2% Lignocaine with 1 microgram/ Kg Fentanyl diluted to the volume of 2 ml NS. (Total volume 32 ml). Mean Onset of Sensory block and Mean Onset of Motor block time both less in fentanyl group than patients in Dexmedetomidine group. Post OP VAS was less in group B followed by group C.

Keywords: efficacy, dexmedetomidine, fentanyl, sensory & motor blockade.

Study Designed: Comparative Study.

1. INTRODUCTION

Peripheral nerve blocks (PNB) are an established and effective method for providing analgesia during surgery. ^[1] They can also be used as the sole anaesthetic technique for some operations. A successful nerve block results from placing the right drug in the right place. A

peripheral nerve block can be achieved as a result of placing local anaesthetic in the close vicinity of a specific nerve or bundle of nerves to block sensation of pain generated & transmitted from a specific area of the body to another. Peripheral nerve blockade allows for the site-specific, long-lasting, and efficient anaesthesia and analgesia that is appropriate for many surgical patients. Peripheral nerve block for upper limb surgery by cocaine reported early in 1885 by William Stewart Halsted. Peripheral nerve blockade now a days can be used alone as the sole “Surgical- Anesthesia”, they not only provide intra operative anesthesia but also avoid the unwanted side-effects of general anesthesia and providing prolonged postoperative analgesia.^[2]

Anesthesia can be administered to the upper limb from the shoulder to the fingertips by blocking the brachial plexus. Depending on the indications for the block, the surgery or treatment being done, medical comorbidities, and individual anatomy variances, there are various methods for blocking the brachial plexus.

Brachial plexus block was first performed by two surgeons Halsted in 1884 Crile^[3] in 1887. The axillary approach of brachial plexus was first shown in 1884 by William Halsted when he injected cocaine under direct vision.^[4] In 1911 Hirschel and Kulenkampff first performed the percutaneous approach of brachial plexus block.^[5]

2. MATERIAL & METHOD

The present study to compare the analgesic efficacy of Dexmedetomidine and Fentanyl as adjuvant to Levobupivacaine and Ligocaine in PNS guided Supraclavicular Brachial Plexus block" was carried out in Department of Anesthesiology index medical college Hospital and Research centre, Indore M.P. after approval of institutional ethical committee in 60 patients of ASA 1 & ASA II posted for elective upper-limb surgery from Sept. 2020 to Sept. 2022 with Ethical committee approval, A prospective observational and comparative study was planned after applying inclusion & Exclusion criteria, Among 60 patient with each 20 into three group (n+20) American society of anaesthesiologist (ASA) grade 1, 2 patient in the age group 20 to 60 years, posted for elective upper limb orthopedic surgeries under brachial plexus block using supraclavicular approach. Preoperative patient will be visited day before the surgery preoperative evaluation done and will be counselled and familiarized with the use of visual analogue scale and the Anaesthetic procedure. All patient will have kept NBM strictly atleast 8 hours before surgeries. An IV access will be achieved on the non-operative arm prior to performing supraclavicular brachial plexus block.

Inclusion Criteria

- Patient with ASA grade 1 & 2
- Patient in the age group 20-60 years of either gender
- Patients undergoing elective upper limb surgeries below mid-humerus level.

Exclusion criteria

- Negative consent
- Patient with any contraindication to regional anaesthesia.

- Refusal for supra clavicular block.
- Patient with coagulation disorder .
- Patient with asa grade >2.
- Patient with history of underlying psychological disorder or any addiction.
- Patient with diabetes peripheral neuropathy, with known allergy to local anaesthesia.
- Patient with infection at the side of block.
- Pregnant patient and lactating mother.
- Patient posted of emergency surgery.
- Incomplete or failed block.

3. RESULTS

Table 1: Comparison of study groups according to ASA Grade I-II

ASA GRADE		B	C	Total
1	Count % within grp	19	20	49
2	Count % within grp	01	00	01
Total		20	20	40

Pearson chi-square test applied.

Chi-square value = 2.105, P value = 0.349, Not significant

The above table shows the distribution of study groups according to ASA grade.

In **Group B**, 19 (95%) patients were in ASA Grade I and 1 (5.0%) were in Grade II.

In **Group C**, 20 (100.0%) patients were in ASA Grade I.

Majority 57 (95%) of the patients in all the groups were in **ASA Grade I**.

There was no statistically significant association between ASA grade and the groups (P=0.349), showing the groups are independent of the ASA grade of the patients.

Table 2: Comparison of study groups according to onset of Sensory and Motor block

		N	Mean	Std. Deviation	P-VALUE
ONSET OF SENSORY BLOCK	B	20	12.50	1.906	.000 (significant)
(min)	C	20	17.40	1.818	

	Total	60	14.17	3.004
ONSET OF MOTOR BLOCK (min)	B	20	18.00	1.864
	C	20	22.55	1.731
	Total	60	20.10	2.961

P value < 0.05 was taken as statistically significant

The above table shows the comparison of mean onset of sensory and motor block in minutes. Mean Onset of Sensory block (min) in group B 12.50 ± 1.906 and in group C 17.40 ± 1.818 .

Table 3: Comparison of study groups according to duration of Analgesia and Duration of Sensory and Motor block

		N	Mean	Std. Deviation	P-VALUE
DURATION OF ANALGESIA (min)	B	20	957.00	259.536	(significant)
	C	20	594.50	64.357	
	Total	60	646.62	281.634	
DURATION OF SENSORY BLOCK (MIN)	B	20	822.00	158.267	(significant)
	C	20	522.00	57.911	
	Total	60	618.90	174.112	
DURATION OF MOTOR BLOCK (min)	B	20	933.00	144.990	(significant)
	C	20	550.50	64.582	
	Total	60	658.25	217.275	

P value < 0.05 was taken as statistically significant. The above table shows the comparison of duration of Analgesia in minutes, duration of sensory block and duration of motor block in

minutes. In group B 957.00 ± 259.536 and in group C 594.50 ± 64.357 . In group B 822.00 ± 158.267 and in group C 522.00 ± 57.911 .

Table 4: Comparison of study groups according to post OP VAS for pain in 24hrs

		N	Mean	Std. Deviation	0.000 (significant)
POST-OP VAS	B	20	1.80	0.410	
	C	20	2.00	0.000	
	Total	40	2.25	0.751	

P value < 0.05 was taken as statistically significant

The above table shows the comparison of post-op VAS in study groups. Post op-VAS in group B 1.80 ± 0.410 and in group C 2.00 ± 0.00 .

4. DISCUSSION

The aim of the study is to compare the efficacy of dexmedetomidine and Fentanyl on onset and duration of sensory, motor blockade and duration of analgesia was carried out in Department of Anesthesiology index medical college Hospital and Research centre, Indore M.P. after approval of institutional ethical committee in 60 patients of ASA 1 & ASA II posted for elective upper-limb surgery from Sept. 2020 to Sept. 2022 with Ethical committee approval, A prospective observational and comparative study was planned after applying inclusion & Exclusion criteria[6].

In Group B, 19 (95%) patients were in ASA Grade I and 1 (5.0%) were in Grade II. In Group C, 20 (100.0%) patients were in ASA Grade I. Majority 57 (95%) of the patients in all the groups were in ASA Grade I. There was no statistically significant association between ASA grade and the groups ($P=0.349$), showing the groups are independent of the ASA grade of the patients.

In **Group B**, 19 (95%) patients were in ASA Grade I and 1 (5.0%) were in Grade II. In **Group C**, 20 (100.0%) patients were in ASA Grade I. **Majority** 57 (95%) of the patients in all the groups were in **ASA Grade I**. There was no statistically significant association between ASA grade and the groups ($P=0.349$), showing the groups are independent of the ASA grade of the patients.

Mean Onset of Sensory block (min) in group A was 12.60 ± 2.137 , in group B 12.50 ± 1.906 and in group C 17.40 ± 1.818 . On the basis of multiple comparison of sensory block with each other's group, A with B, mean difference was 0.1 ± 0.619 and with study group C it was -4.800 ± 0.619 On comparing group, B with A, mean difference was -0.1 ± 0.619 and with study group C it was -4.900 ± 0.619 , which means early onset seen in fentanyl group than dexmedetomidine than control group[7]. On comparing group, C with A, mean difference was 4.800 ± 0.619 and with study group B it was 4.900 ± 0.619 [8].

Mean Onset of Motor block (min) in group A was 19.75 ± 3.110 , in group B 18.00 ± 1.864 and in group C 22.55 ± 1.731 . On the basis of multiple comparison of motor block with each other's, A with B, mean difference was 1.75 ± 0.734 and with study group C it was -2.800 ± 0.734 . On comparing group, B with A, mean difference was -1.75 ± 0.734 and with study group C it was -4.550 ± 0.734 . On comparing group, C with A, mean difference was 2.800 ± 0.734 and with study group B it was 4.550 ± 0.734 , which means early onset seen in fentanyl group than dexmedetomidine than control group[9].

We compare all the study group with each other's we found dexmedetomidine has better VAS score than fentanyl.

We don't get any previous research which indicates post op vas score comparing dexmedetomidine and fentanyl in supraclavicular block as adjuvant.

5. CONCLUSION

Group 'B' = given 20 ml of 0.5% Levobupivacaine and 10 ml of 2% Lignocaine with 1 microgram / Kg Dexmedetomidine diluted to the volume of 2 ml NS. (Total volume 32 ml) and Group 'C' = given 20 ml of 0.5% Levobupivacaine and 10 ml of 2% Lignocaine with 1 microgram/ Kg Fentanyl diluted to the volume of 2 ml NS. (Total volume 32 ml). Mean Onset of Sensory block and Mean Onset of Motor block time both less in fentanyl group than patients in Dexmedetomidine group. Duration of sensory block and motor block both more in Dexmedetomidine group than patient in fentanyl group. Post OP VAS was less in group B (Dexmedetomidine group) followed by group C (fentanyl group).

6. REFERENCES

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