



TO COMPARE THE ANALGESIC EFFICACY AND DURATION OF ANALGESIA IN ULTRASOUND GUIDED TAP BLOCK VS ULTRASOUND GUIDED CAUDAL BLOCK IN PAEDIATRIC PATIENTS

Anaesthesiology

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ABSTRACT

Background And Aims: Ultrasound guided TAP block and ultrasound guided Caudal block has gained greater acceptance nowadays by the patient as well as by the doctors, as it gives greater accuracy and precision and less side effects and less chances of drug being delivered to site other than the site of interest. **Methods:** Following ethics committee approval, 42 consenting patients of ASA grade I & II, age ranging from 5-12 years undergoing unilateral below umbilical surgery were randomised into two groups of 21 patients each. Exclusion criteria include lack of consent by the parents, local site infection, any vertebral deformity, coagulopathies and previous known history of allergy. **Tap Group:** received TAP block with 0.5mL/kg of 0.25% bupivacaine under USG guidance. **Caudal Group:** received caudal block under USG guidance with 0.5mL/kg of 0.25% bupivacaine, with patient in left lateral position. Post operative pain scores were compared at 0hr, 2hr, 4hr, 6hr, 24hr and rescue analgesic dose requirement were noted. **Result:** After comparing both the groups, we found no statistically significant difference in age, gender, ASA status and duration of surgery. For TAP block the mean duration of analgesia was 5 ± 0.35 h, which is longer than the caudal analgesia (4.6 ± 0.32 h) with p value of 0.046. Number of rescue analgesic requirement in TAP block was significantly less when compared to caudal block group. **Conclusion:** Degree of analgesia provided by TAP block is superior when compared to caudal block in pediatric patients undergoing unilateral below umbilical surgeries. This is confirmed by lower pain scores in post operative period. Lesser number of rescue analgesic doses were required in TAP block group when compared to Caudal block group.

KEYWORDS

TAP block, Caudal Block, Duration of analgesia, Rescue Analgesia

INTRODUCTION

Management of postoperative pain is an integral part of the enhanced recovery after surgery (ERAS) programme. Poorly managed pain can lead to inadequate patient mobilisation with its negative consequences on postoperative recovery and rehabilitation. Appropriate pain relief leads to shortened hospital stay, reduced costs, and increased patient satisfaction. Treatment of postoperative pain is an increasingly monitored measure for the quality of care offered to the patients.

Regional anesthetic techniques along with general anesthesia decreases the requirement of inhalational anesthetic and opioids and attenuate the stress response to surgery. Regional anesthesia in combination with general anesthesia facilitates smooth recovery and provides good immediate post operative analgesia with less systemic analgesic requirements, early recovery and less hospital stay.

Individual variability leads to varied pain experiences and affects responses to pain treatment. Identifying the patients at risk of experiencing significant postoperative pain will allow for more individualised and effective pain management. In this randomised control trial study, we administer TAP block in one group of patients and Caudal block in another group of patients undergoing below umbilical surgeries just before extubating patient from general anaesthesia. Post operative pain scores were noted in each group and compared in the first 24 hours. Second aim was to compare the number of rescue analgesic dose requirement.

METHODS

The current study was approved by institutional ethics committee (vide approval number EC/BMHR/2023/27 dated 22nd March 2023). The study was conducted in tertiary care hospital following ethical principles. After explaining the study protocol, written informed consent was obtained from all the patients for participation in the study and using the patient data for research and publication. Total 42 patients were included in this study of ASA grade I & II, age ranging from 5-12 years, planned for unilateral below umbilical surgeries were randomized into two groups of 21 patients each group. Exclusion criteria include lack of consent by the parents, local site infection, any vertebral deformity, coagulopathies and previous known history of allergy.

On the day prior to the surgery, the patients were explained about the Visual Analogue Scale (VAS, in which 0 indicated no pain and 10 indicated severe pain) and its categorisation (mild [1-3], moderate [4-6], and severe [7-10] pain).

Induction of general anaesthesia was standardised and included premedication with intravenous glycopyrrolate (0.005mg/kg), fentanyl (1-2µg/kg) followed by propofol (2-2.5 mg/kg) and vecuronium (0.1 mg/kg) or atracurium (0.5 mg/kg).

A suitably sized endotracheal tube was inserted into the trachea bilateral equal chest air entry checked and tube fixed. Anaesthesia was maintained using oxygen, nitrous oxide and sevoflurane (MAC 1.2). Non invasive blood pressure, electrocardiogram, oxygen saturation, and capnogram were recorded. Intraoperative analgesic dose was restricted to single dose of fentanyl.

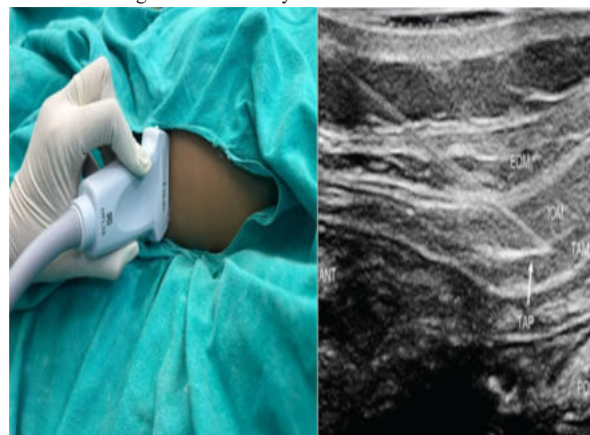


Image 1: Position of high frequency linear

Image 2: Ultrasound view of TAP compartment Ultrasound probe for visualising TAP compartment



Image 3: Longitudinal paramedian position of



Image 4: Ultrasound guided view of Caudal Block Linear ultrasound probe for observation of caudal blockade.

In the post anaesthesia care unit (PACU), intravenous paracetamol was administered to treat mild to moderate pain. Time was noted for first rescue analgesia in both groups and subsequent rescue analgesic doses.

RESULTS

After comparing both the groups, no statistically significant difference was found in age, gender, ASA status and duration of surgery. For TAP block the mean duration of analgesia was 5 ± 0.35 h, which is longer than the caudal analgesia (4.6 ± 0.32 h) with p value of 0.046.

Table 1 Preoperative patient factors

	TAP/CAUDAL	N	Mean	SD	p value
AGE(Yrs.)	TAP	21	7.52	2.64	0.459
	CAUDAL	21	8.14	2.73	
Weight (Kg)	TAP	21	26.58	10.42	0.221
	CAUDAL	21	30.64	10.77	
Duration Of Surgery	TAP	21	69.62	17.05	0.429
	CAUDAL	21	65.29	18.09	

Figure 9 Comparison of systolic Blood Pressure Between Both Groups

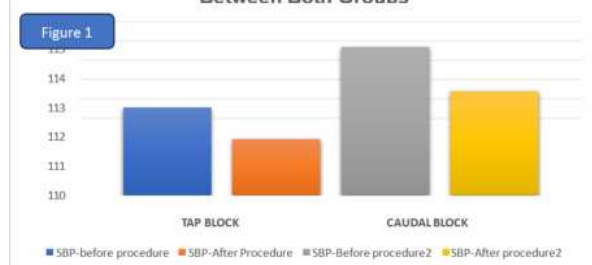


Table 2. Systolic Blood Pressure(mean) Before and After Procedure

Systolic Blood Pressure (Mean) Before and After Procedure			
TAP BLOCK		CAUDAL BLOCK	
SBP- Before Procedure	SBP- After Procedure	SBP- Before Procedure	SBP- After Procedure
112	110	114	112

Figure 2 Comparison of Diastolic Blood Pressure Between Both Groups

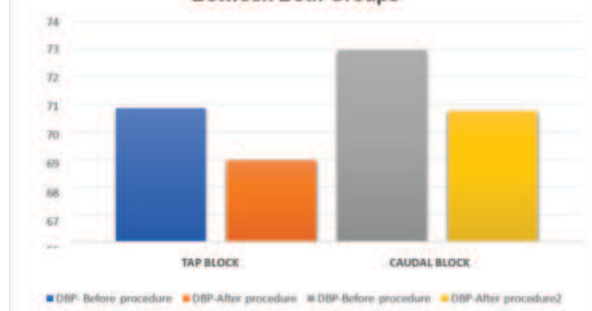


Table 3. Diastolic Blood Pressure Before And After Procedure

Diastolic Blood Pressure (Mean) before and after Procedure			
TAP BLOCK		CAUDAL BLOCK	
DBP Before Procedure	DBP After Procedure	DBP Before Procedure	DBP After Procedure
70	68	72	70

Table 4. Heart Rate (Mean) Before and After Procedure

Heart Rate (Mean) Before and After Procedure			
Tap Block		Caudal Block	
HR Before Procedure	HR After Procedure	HR Before Procedure	HR After Procedure
110.95	106	109.42	105.19

Figure Heart Rate Before and after Procedure

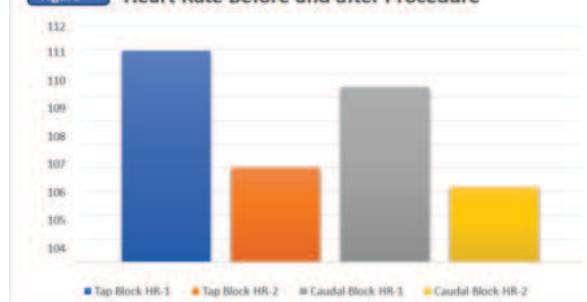


Table 5. Duration of Analgesia Comparison Between Both Groups

Duration Of Analgesia Comparison Between Both Groups (minutes)		
	Tap Block	Caudal Block
DURATION(Min)	298.15+35.90	276.43+32.8

Figure3 Duration of analgesia comparison between both groups



DISCUSSION

In this study, pain scores were almost same in both groups at 30 min and 1 h in the post anaesthetic care unit. While pain scores at 12 h and 18 h were significantly higher in the caudal group when compared to the TAP block group.

Pain relieve was for longer time in TAP block group in comparison to that of caudal block. Total doses of paracetamol consumption in terms of rescue analgesia were higher in caudal block group when compared to TAP block group. Moreover, the time of first rescue analgesia was longer for TAP block patients in comparison of caudal block group.

This demonstrated that both the TAP block and the Caudal block can provide effective analgesia in these patients but TAP block is superior over caudal block as evidenced by longer duration for first analgesic request, lower pain scores and less analgesic requirement.

Around four hours was the average pain free time for caudal block using 0.25% bupivacaine, 0.5ml/kg. Time of analgesia can be prolonged using additives like clonidine, but in this study, we did not use any additives. Composition of local anaesthetic in the form of volume and concentration was standardized for both groups. we did not observe any complications in post operative period in both the groups.

On the other hand, TAP block is a plane block that aims at infiltrating the local anaesthetic near the transversus fascia plane (T6 to L1) which supply somatic sensations to muscles of anterior abdominal wall. The spread of local anaesthetic in this plane is dependent on the site of injection and how much volume is injected.

Measures were taken to optimize the conditions to improve success rate for TAP block:

- Type of operation which produces minimal or no visceral pain.
- Choosing the site of LA injection, lateral TAP block in which the spread of local anesthetic targets mainly dermatomes below the umbilicus (T10 to L1)

III) use of large volume of local anesthetic (0.5ml/kg of 0.25% bupivacaine) without exceeding the maximum dose limit.

IV) Choice of unilateral cases so that the whole volume of local anesthetic is injected on one side and not divided on both sides. Under these conditions, TAP block proved to provide superior analgesia when compared to caudal block.

In a study by, Elbahrawy and El-Deeb showed that pain scores were comparable in both groups, but TAP block group was discharged much earlier when compared to the caudal block group. The duration of analgesia was comparatively longer in TAP block group than the caudal block group. Total number of rescue analgesic doses was significantly higher in caudal group when compared to that of the TAP block group. Our study was nearly similar to this study.

CONCLUSION

TAP block provide superior degree of analgesia when compared to caudal block in paediatric patients undergoing below umbilical surgeries. This is confirmed by lower pain scores in post operative period. The number of rescue analgesic doses required for TAP block was much less than that of the caudal block. Also, the duration of analgesia was longer for TAP block in comparison to caudal block.

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