

*Research Article***Is Caudal Block Has an Effect on postoperative Pediatric Hemodynamics?****Ibrahim T. Ibrahim, Shadwa R. Hassanein and Arwa Essam Anwar**

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**Abstract**

**Background:** Caudal block is the most commonly used technique of regional anesthesia performed on children that is suitable for use during various types of surgical interventions located below the level of the navel. This technique provides a safe approach to the epidural space in children. **Patients and Methods:** A total of 40 pediatric patients of both sex, ASA I and II, aged between 2 to 6 years, scheduled for lower abdominal surgery, under general anesthesia were included in the study. Patients were randomly allocated into 2 equal groups each containing 20 patient. Group (CB) received ultrasound guided Caudal Block in a dose 2.5mg/kg of bupivacaine (0.25%) and group (C) didn't receive any block. **Results:** There was a significant increase in HR, Systolic and Diastolic blood pressure in the Control group than (CB) group that had more hemodynamic stability **Conclusion:** we concluded that caudal block is an easy and safe technique and causes more hemodynamic stability.

**Keywords:** caudal block, regional anesthesia, pediatrics.**Introduction**

Caudal epidural block is a popular and reliable technique in lower abdominal surgeries especially in children as it provides hemodynamic stability and analgesia during both intra and postoperative period<sup>(1)</sup>.

Some guidelines must be followed when analgesia is administered to children; a pain-related treatment program should provide medication preference, appropriate dosage intervals, prompt half-life drug usage, or ideally oral medication administration. Different medications should be selected depending on the procedure conducted by the age and pain level of the patient<sup>(2)</sup>.

The following interventions are prescribed according to pain level as pediatric postoperative pain management strategies; mild pain: non-steroidal analgesics (NSAID); moderate pain: NSAID, NSAID and opioid combination, IV opioids (continuous injection, PCA, continuous opioid administration) and regional anesthetics; extreme pain: IV opioids and regional anesthetics<sup>(3)</sup>.

The children can use all regional block strategies used in adults. Regional procedures for postoperative pain control in children are

usually performed after general anesthetic induction or sedation. Regional techniques combined with general anesthetics in the pediatric population reduce the consumption of intraoperative analgesics and volatile anesthetics, decrease the stress response to surgery and promote rapid and painless recovery from operation. The site and type of surgical procedure are important when choosing a method<sup>(3)</sup>.

Ultrasound allows the anatomical structures to be visualized in real time, directs the blocking process itself, and displays the distribution of the injected local anesthetic solution. For pediatrics, where most blocks are in anesthetized patients, a faster onset of block using less local anesthetic solution is particularly appealing. Ultrasound guidance may also be useful in infants and children for caudal and epidural blocks, as the sacrum and the vertebrae are not fully ossified. Ultrasound-guided techniques for infraclavicular brachial plexus blocking and the lumbar plexus block in pediatrics have been identified<sup>(4)</sup>.

**Aim of the work**

Evaluation of the hemodynamic effect of caudal block in the post-operative period.

**Patients and methods**

After approval of university ethical committee and written informed consent from parent of the children, this prospective randomized double blind controlled study was conducted in Minia University hospital during the period from February 2019 to January 2020. A total of 40 pediatric patients of both sex, ASA I and II, aged between 2 to 6 years, scheduled for lower abdominal surgery, under general anesthesia were included in the study.

**Exclusion criteria:**

- History of allergy to the studied drug.
- Spinal and Meningeal Anomalies.
- History of developmental delay.
- Blood Disease.

- Infection at site of injection.

**Patients'groups**

Patients were randomly allocated into 2 equal groups each containing 20 patients. Group (CB) received ultrasound guided Caudal Block in a dose 2.5mg/kg of bupivacaine (0.25%) and group (C) didn't receive any block. Anesthetic technique was standardized in both groups. Systolic and Diastolic Arterial Blood Pressure, O2 saturation were assessed.

**Results**

The two studied groups were comparable as regards the age, sex distribution, with no significance as shown in table (1).

**Table (1): Demographic data in the studied groups (data presented as mean ± SD or number and percentage)**

Variable	Group CB	Controls C	P value
Age Range Mean ±SD	2-6 3.57±1.38	2-6 3.89±1.60	0.772
Sex Male Female	9(45%) 11(55%)	10(50%) 10(50%)	0.693

There was a significant increase in HR in (C) group in studied interval when compared with basal value while in (CB) group there was more stability in HR as shown in table (2).

**Table (2): Postoperative changes in the heart rate (beat/min) (data presented as mean ± SD)**

HR	Group CB	Control C	P value
At PACU Range Mean±SD	83-120 98.40±10.13	87-130 107.52±12.25	0.000**
At 2 hour Range Mean ±SD	82-117 96.51±8.47	# 83-139 112.01±14.64	0.000**
At 4 hour Range Mean ±SD	74-129 96.19±13.25	# 102-132 117.32±7.20	0.000**
At 6 h Range Mean ±SD	79-119 103.59±10.59	# 93-122 109.06±6.78	0.000**
At 12 h Range Mean ±SD	# 94-119 106.64±7.25	99-124 110.71±6..57	0.008**

There was a significant increase in the systolic and diastolic blood pressure in (C) group than in (CB) group in the postoperative period as shown in tables (3) and (4).

**Table (3): Post-operative changes in the Systolic blood pressure (mmHg) (data presented as mean  $\pm$  SD).**

SBP	Group CB	Control C	P value
At PACU Range Mean $\pm$ SD	80-100 88.24 $\pm$ 5.45	90-100 95.49 $\pm$ 2.24	0.000**
At 2 hour Range Mean $\pm$ SD	# 80-90 86.75 $\pm$ 5.45	# 90-100 97.24 $\pm$ 4.14	0.000**
At 4 hour Range Mean $\pm$ SD	# 80-100 86.00 $\pm$ 5.76	# 95-100 99.25 $\pm$ 3.73	0.000**
At 6 h Range Mean $\pm$ SD	# 80-100 93.75 $\pm$ 5.35	# 90-105 97.25 $\pm$ 3.43	0.000**
At 12 h Range Mean $\pm$ SD	# 80-100 94.75 $\pm$ 4.72	95-105 96.40 $\pm$ 2.35	0.005**

**Table (4): Changes in the Diastolic blood pressure (mmHg) (data presented as mean  $\pm$  SD).**

DBP	Group CB	Control C	P value
At PACU Range Mean $\pm$ SD	50-60 52.74 $\pm$ 3.5	50-70 54.5 $\pm$ 5.31	0.005**
At 2 hour Range Mean $\pm$ SD	50-60 52.25 $\pm$ 3.43	50-75 55.51 $\pm$ 5.84	0.000**
At 4 hour Range Mean $\pm$ SD	# 50-55 51.51 $\pm$ 2.36	# 50-75 55.51 $\pm$ 6.1	0.000**
At 6 h Range Mean $\pm$ SD	50-60 52.75 $\pm$ 3.44	55-70 55.75 $\pm$ 5.90	0.000**
At 12 h Range Mean $\pm$ SD	50-60 53.25 $\pm$ 3.35	50-70 55.75 $\pm$ 5.91	0.008**

There was no significant difference between the two studied groups as regarding the arterial oxygen saturation in the postoperative period as shown in (Table 5)

**Table (5): Changes in the arterial oxygen saturation (SaO<sub>2</sub>) in percentage (data presented as mean ± SD).**

SaO <sub>2</sub>	Group CB	Controls C	P value
<b>At PACU</b>			
Range	98-99	97-99	0.374
Mean ±SD	98.95± 0.22	98.75± 0.76	
<b>At 2 hour</b>			
Range	98-100	98-99	0.726
Mean ±SD	98.95±0.39	98.80±0.22	
<b>At 4 hour</b>			
Range	98-100	99-100	0.486
Mean ±SD	99.05±0.22	98.85±0.39	
<b>At 6 h</b>			
Range	99-100	98-99	0.232
Mean ±SD	99.05±0.39	98.90±0.22	

## Discussion

Caudal block is the most common technique of regional anesthesia used to relieve pain in children following lumbosacral to midthoracic dermatomal surgery. Caudal block is associated with limited analgesic length using single shot technique<sup>(5)</sup>.

We found more hemodynamic stability in group (CB) than Controlled group. Our results were in agreement with Acharya et al., 2013 compared 2 different doses of fentanyl as an adjuvant for caudal block in patients aged 2-7 years undergoing infraumbilical surgery to assess hemodynamics. They divided patients into three groups, group I received caudal block with bupivacaine 0.25% with normal saline, group II received caudal block with bupivacaine 0.25% with fentanyl 0.5mcg/kg and group III received caudal block with bupivacaine 0.25% with fentanyl 1mcg/kg, they reported no statistical significance in hemodynamics pre-operative, intraoperative and postoperative between the three groups<sup>(6)</sup>.

## References

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