

To Study the Effectiveness Of Perfusion Index and Anal Sphincter Tone In Assessing Onset of Caudal Block in Children

¹Dr.S.Kasthuri Bai, Dr.G.Anitha²

¹Assistant Professor Pudukkottai Medical College Pudukkottai.

Corresponding Author: Dr.G.Anitha

Assistant Professor Coimbatore Medical College Coimbatore.

Abstract:

AIMS/OBJECTIVES: The onset of a successful caudal block in children is assessed by hemodynamic parameters, swoosh test and anal sphincter tone. Recently, Perfusion Index has been used to assess the onset of epidural anaesthesia in adults. So, we decided to compare Anal sphincter tone and Perfusion index to assess the onset and success of caudal block.

MATERIALS AND METHODS: This is an Observational study, 60 children aged 2- 8 years belonging to ASA PS I and II undergoing infraumbilical surgeries were included. Premedicated with syp.Midazolam (0.5mg/kg), IV line was secured and preoxygenated. Inj.Glycopyrrolate (0.01mg/kg), Inj.Ketamine (1mg/kg),Inj.propofol(1mg/kg) were given and mask ventilated with N2O:O2 & sevoflurane 1-2 % with JR paediatric circuit. Caudal block was performed with Inj.Bupivacaine 0.25% 1ml/kg. Perfusion index(PI) and Anal sphincter tone (AST) were assessed before and 0,2,4,8,10 minutes after caudal block. Vitals(HR,BP,SPO2) monitored.

RESULTS: 57 cases had a successful caudal block with 3 failures. Both Perfusion index& Anal Sphincter Tone were highly & equally sensitive(100%) in predicting the caudal success. But, Perfusion Index significantly increased at 4 min (Mean2.79+ -0.46SD, p value <0.05) whereas Anal Sphincter Tone significantly decreased at 6 min after caudal block(Mean2.79+ -0.41SD ,p value <0.05).

CONCLUSION: Perfusion Index is an objective & non-invasive monitor that predicts the caudal onset much earlier than Anal Sphincter Tone.

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I. Introduction:

The onset of a successful caudal block in children is assessed by hemodynamic parameters, swoosh test and anal sphincter tone. Recently, Perfusion Index has been used to assess the onset of epidural anaesthesia in adults. So, we decided to compare Anal sphincter tone and Perfusion index to assess the onset and success of caudal block.

AIM

To study the effectiveness of perfusion index and anal sphincter tone in assessing onset and adequacy of caudal block in children. 60 Children of 2years to 8years age, ASA Physical status 1-2, posted for elective infra umbilical surgeries were included in this study. Parent/guardian refusal, H/o allergy to either drugs, Infection at the site of injection, Coagulopathies or on anticoagulation therapy, Congenital abnormalities of lower spine and meninges were excluded in this study.

METHODOLOGY : This is an observational study. After approval from IEC and informed written consent from the parents, this study was performed.

Sample size : 60

INCLUSION CRITERIA:

1. Age between 2years to 8years
2. ASA Physical status 1-2
3. Patients posted for elective infra umbilical surgeries

EXCLUSION CRITERIA:

1. Parent/guardian refusal
2. H/o allergy to either drugs.
3. Infection at the site of injection.

4. coagulopathies or on anticoagulation therapy
5. congenital abnormalities of lower spine and meninges

This was an observational study All children underwent pre anesthetic check-up before surgery. After obtaining Informed parental consent, the children were kept nil per oral for 6 hours before surgery . They were premedicated with syp.Midazolam (0.5mg/kg)30 minutes before surgery .After securing IV line they were given Inj.Glycopyrrolate (0.01mg/kg), IV., Inj.Ketamine (1mg/kg), Inj.propofol (1mg/kg) and mask ventilated with N2O:O2 1:1 and sevoflurane 1-2 % . Under strict aseptic precautions, patient in left lateral position using a 22G hypodermic needle, caudal block was given with Inj.Bupivacaine 0.25% 1ml/kg. All children were assessed for perfusion index and anal sphincter tone before caudal and every 2 minutes after caudal block. Anal sphincter tone were assessed by the surgeon and categorized as 1= Tight sphincter tone,2=decreased sphincter tone,3=lax sphincter tone. Perfusion index was measured by masimo pulse oximeter. Heart Rate, Systolic blood pressure ,Diastolic blood pressure and Oxygen saturation were observed . The surgical incision is made 10 minutes after caudal block. If there is more than 20% increase in Heart Rate, then it is considered as caudal failure.

II. Results And Observation:

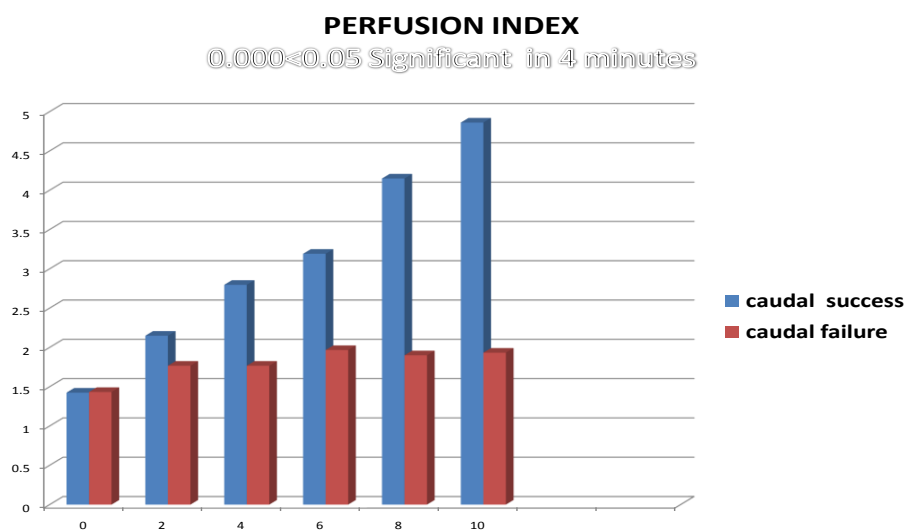
Out of 60 children, caudal block was successful in 57 cases whereas it failed in 3 cases. Comparing the demographic profile, 18 children were between 2-3years of age & 42 between 4-6years of age. Average height of the children was 108 cms. Average weight of the children was 20kgs.

PARAMETERS	VALUE
AGE	5.6 ±1.9
HEIGHT	108±12
WEIGHT	20±0.5

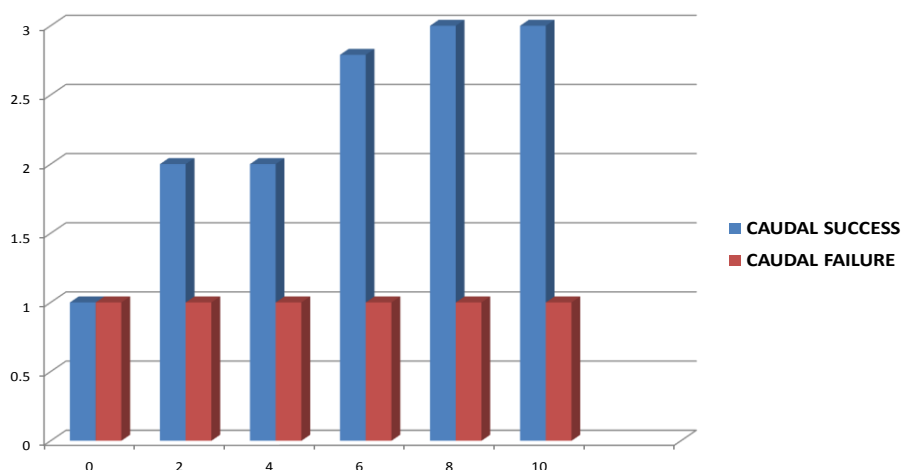
Out of the 60 children, 26 children in each group underwent surgeries involving thoraco-lumbar dermatomes that required a maximum level of T10 whereas the remaining 34 surgeries of both groups involved the sacral dermatomes.

SURGERIES	NO OF CASES	PERCENTAGE
HERNIOTOMY	15	25%
PVSL	25	41%
APPENDICECTOMY	2	3%
PHIMOSIS	18	30%

In children in whom caudal was successful, Perfusion index significantly increased at the 4minute (Mean2.79+ -0.46SD, p value <0.05) whereas anal sphinter tone became lax (Score -3) at the 6th minute (Mean2.79+ -0.41SD, p value <0.05). In comparison, children in whom caudal was unsuccessful, there was no change in Perfusion Index and the Anal sphincter tone was tight (Score-1).



ANAL SPHINCTER TONE
0.000<0.05 Significant in 6 minutes



Heart rate was significantly increased in caudal failure cases. Heart rate, Systolic BP and Diastolic BP significantly decreased in caudal success cases

Mins	CAUDAL SUCCESS					CAUDAL FAILURE					p VALUE				
	0	5	10	15	20	0	5	10	15	20	0	5	10	15	20
HR	102.00	102.21	103.39	102.79	103.81	100.00	125.67	116.67	112.00	110.00	>0.05	<0.05	<0.05	<0.05	<0.05
SBP	100.68	97.37	93.54	91.70	91.30	100.67	102.00	100	101.33	102	>0.05	<0.05	<0.05	<0.05	<0.05
DBP	60.65	50.35	50.40	50.86	51.05	60.67	62.67	62.00	63.33	63.33	>0.05	<0.05	<0.05	<0.05	<0.05

III. Discussion:

Caudal block is one of the commonest regional techniques performed in children. It is usually performed under i.v. sedation which makes it difficult to assess the success & onset of the caudal block. So, there have been various methods/tests to detect the success of the caudal block like Swoosh test, Anal sphincter tone test, Heart rate & Blood pressure response to surgical incision. Recently, Perfusion index has been used to assess the success of epidural anaesthesia in adults.

Perfusion index is noninvasive and indirect technique that measures the peripheral perfusion. Decrease in Perfusion index can occur as a result of local vasoconstriction while vasodilatation results in increase in perfusion index. Following caudal block there will be sympathectomy that results in reduced vasomotor tone and increased peripheral perfusion thereby resulting in a increase in perfusion index.

Internal Anal Sphincter is under the control of Sympathetic fibers (contraction) and parasympathetic fibers (relaxation). Following caudal block, the anal sphincter becomes lax due to sympathectomy. The tone was assessed by the surgeon in all the cases.

In our study, in caudal success cases, though the anal sphincter tone became relaxed, it took a slightly longer time for it to become totally lax (Score-2). In contrast, the perfusion index almost doubled from the baseline in a shorter time in caudal success cases.

Ketamine can cause vasoconstriction resulting in decrease Perfusion index whereas Propofol causes vasodilatation leading to increased Perfusion Index. These drugs may interfere with the Perfusion Index value. So to avoid this interference, we have taken the increase in Perfusion Index & not the absolute values to detect the success of caudal block.

LIMITATIONS:

The assessment of anal sphincter tone though done by the same surgeon in all cases is a still subjective one which may have contributed to the superiority of PI over sphincter tone. Objectively, anal sphincter tone can be assessed by Ano rectal Manometry method which we did not employ in our study.

IV. Conclusion:

Perfusion index is an objective & non-invasive monitor that predicts the caudal onset much earlier than Anal sphincter tone.

References

- [1]. TOBIAS J.D.: Caudal epidural block: A review of test dosing and recognition of systemic injection in children. *Anesthesia and Analgesia*, 93 (5): 1156-61, 2001
- [2]. Verghese ST, Mostello LA, Patel RI, et al. Testing anal sphincter tone predicts the effectiveness of caudal analgesia in children. *Anesth Analg* 2002; 94: 1161–1164.
- [3]. Comparison of saddle, lumbar epidural and caudal blocks on anal sphincter tone: A prospective, randomized study Yoon-Jung Shon¹, Jin Huh¹, Sung-Sik Kang¹, Seung-Kil Bae¹, Ryeong-Ah Kang² and Duk-Kyung Kim² .*Journal of International Medical Research* 2016, Vol. 44(5) 1061–1071
- [4]. GINOSAR Y., WEINIGER C.F., MEROZ Y., KURZ V., BDOLAH-ABRAM T., BABCHENKO A., et al.: Pulse oximeter perfusion index as an early indicator of sympa-thectomy after epidural anesthesia. *Acta anaesthesiologica Scandinavica*, 53 (8): 1018-26, 2009.
- [5]. Dalens B, Hansonai A. Caudal anesthesia in pediatric surgery success rate and adverse effects in 750 consecutive patients. *Anesth Analg* 1989;68:83–9.
- [6]. R. H. Friesen and J. E. Morrison, "The role of ketamine in the current practice of paediatric anaesthesia," *Pediatric Anesthesia*, vol. 4, no. 2, pp. 79–82, 1994.

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