ULTRASOUND GUIDED PERICAPSULAR NERVE GROUP BLOCK VERSUS ULTRASOUND GUIDED CAUDAL BLOCK FOR POSTOPERATIVE PAIN IN PAEDIATRIC HIP SURGERY

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INTRODUCTION

Paediatric hip surgeries such as open reduction for developmental dysplasia of the hip (DDH) lead to extensive injuries and severe pain. Perioperative pain control is of paramount importance during paediatric hip surgery.

Caudal block is a common technique used for perioperative pain relief in paediatric lower limb surgeries but despite the success of neuraxial blocks in decreasing postoperative pain scores in paediatric patients undergoing hip surgery, positioning requirements, bilateral sensory and motor blockade, and urinary retention limit their use.

Among peripheral nerve block techniques used for relieving pain associated with hip fracture, femoral nerve (FN) block, fascia iliaca compartment (FIC) block and 3-in-1 FN block are widely used. However, these techniques have often failed to provide adequate block of the obturator nerve (ON) and the accessory obturator nerve (AON).

The pericapsular nerve group (PENG) block, first described by Girón-Arango et al. in 2018, has emerged as a promising alternative for hip analgesia. This ultrasound-guided block selectively targets the articular branches of the femoral, obturator, and accessory obturator nerves, which provide sensory innervation to the anterior hip capsule. While its use has been well-documented in adult patients with hip fractures, evidence supporting its efficacy in the paediatric population remains limited

AIM OF THE WORK

The primary aim was to compare between both techniques as regards Postoperative opioid consumption.

The secondary aim was to compare between both techniues as regards postoperative analgesia by using face, legs, activity, and cry consolability scale [FLACC], duration of postoperative analgesia, haemodynamics (changes in heart rate and mean arterial blood pressure), Incidence of complications, and parent satisfaction.

PATIENTS AND METHODS

The present study was carried out in Alexandria Main University hospitals on 50 paediatric patients belonging to American society of anaesthesiologists (ASA) class I or II, aged 2-8 years scheduled for hip surgery after having written informed consent from every parent.

Exclusion Criteria:

Parent refusal, skin infection at site of injection, bleeding disorder or receiving anticoagulants, history of allergy or contraindication to LAs, neurological disease as cerebral palsy.

Full medical, surgical, anaesthetic history was taken from parents. Routine laboratory investigations were reviewed. All participants were premedicated with 0.5mg/kg oral midazolam about 30min before admission to the operating room. The routine standard monitoring was applied to all participants.. After induction of general anaesthesia, the eligible participants were randomized into two equal:

Group (P): Patients received US-guided PENG block with 0.5 ml/kg of bupivacaine 0.25%.

Group (C): Patients received US-guided caudal block with 0.5 ml/kg of bupivacaine 0.25%.

RESULTS

Table 1: Demographic data, type and duration of surgery.

	Group C	Group P	Test of significance	P value
Sex - male/female (n)	10/15	9/16	χ^2=0.085	0.771
Age (years), mean (SD)	3.12 (1.06)	3.02 (1.0)	U=298.50	0.780
Weight (kg) , mean (SD)	13.88 (2.28)	13.36 (2.04)	U=273.00	0.436
Type of surgery	DDH triple Attack 23Perthe's shelf osteotomy 2	DDH triple Attack 24Perthe's shelf osteotomy 1	FET=0.355	1.000
Duration of surgery, mean (SD)	114.5 (13.06)	115.2 (11.80)	t=0.193	0.848

n: number of patients, U: Mann Whitney test, χ2: Chi square test, FET: Fisher Exact test,
SD: Standard deviation, t: Student t-test p: p value for comparing between the two studied groups
*: Statistically significant at $p \leq 0.05$

Table 2: Study parameters in the two groups

	Group C	Group P	Test of significance	P value
Intraoperative fentanyl Consumption (µg), mean (SD)	1.36 (2.79)	3.54 (3.53)	U=215.00*	0.027*
First rescue analgesia (h), Mean (SD)	6.08 (1.96)	15.83 (2.55)	U= 2.500*	<0.001*
Postoperativenalbuphin Consumption (mg), mean (SD)	3.89 (1.0)	2.03 (0.84)	U=41.50*	<0.001*

SD: Standard deviation, U: Mann Whitney test ,
p: p value for comparing between the two studied groups, *: Statistically significant at $p \leq 0.05$

Table 3: Postoperative FLACC score

Time of recording	Group C	Group P	U	P
30 m	1 (0,1)	1 (0,1)	272.00	0.399
2 h	1 (0,2)	1 (0,2)	298.00	0.766
4 h	1 (0,2)	1 (0,2)	243.00	0.155
6 h	3 (3,4)	1 (1,2)	30.000*	<0.001*
8 h	3 (3,3)	3 (2,3)	175.50*	0.002*
12 h	4 (3,4)	3 (2,3)	143.50*	<0.001*
16 h	3 (3,4)	4 (3,4)	249.00	0.166
20 h	4 (3,4)	3 (3,4)	250.00	0.160
24 h	3 (3,4)	3 (3,4)	295.00	0.707

Data presented as median (IQR), FLACC=Face, Legs, Activity, Cry= Consolability, h=Hour, m=minutes, U: Mann Whitney test, p: p value for comparing between the two studied groups in each periods, *: Statistically significant at $p \leq 0.05$

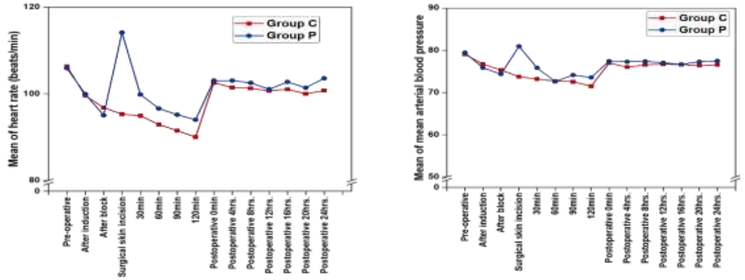

Figure 1: Comparison between the two studied groups according to heart rate and mean arterial blood pressure

CONCLUSIONS

PENG block is a novel technique that provides adequate postoperative analgesia in paediatric hip surgery as it reduces postoperative pain scores, prolongs time to first rescue analgesia and decreases postoperative opioid consumption

PENG block is simple, safe and effective approach and can be used as an alternative to caudal block in paediatric hip surgery.