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Research Article

PAIN DURING NEONATAL CIRCUMCISION: COMPARISON IN DORSAL PENILE VERSUS COMBINED DORSAL AND VENTRAL PENILE BLOCK IN A RANDOMIZED CONTROL TRIAL

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Abstract:

Objective: To assess the pain during neonatal circumcision with dorsal penile versus combined dorsal penile nerve and ventral penile block

Material and Method:

Total of 200 full term neonates electively presented at circumcision clinic for plasti-bell (Hollister Inc) circumcision. All parents were counseled for mode of analgesia and randomization. Written consent was taken from all parents. In Group A only dorsal penile nerves were anesthetized and in Group B along with dorsal penile nerves, additional anesthesia was also injected on ventral aspect of penile shaft. Pain was assessed on modified - Neonatal Infant Pain Scale (NIPS). Pulse and Oxygen saturation was monitored with trans-cutaneous pulseoximeter. Data was analyzed using SPSS version 23. p value of <0.05 is considered as statistically significant.

Results:

In Group A, mean age of neonates was 4.4 ± 1.6 months and in Group B mean age was 4.1 ± 1.2 months. When compared p value was statistically not significant ($p=0.09$). The mean weight in Group A was 5.2 ± 0.4 Kg and in Group B was 4.9 ± 0.6 kg, when compared $p=0.08$. The mean Neonatal Infant pain score in Group A was 4.0 ± 0.3 and in Group B 2.9 ± 0.4 , when compared $p < 0.001$. Pulse and oxygen saturation in group A was 149 ± 70 beats/minutes, 98%. And in Group B it was 131.2 ± 29.8 beats/minute and saturation of 98%. When compared both groups there was statistically significant deference in pulse rate $p < 0.001$ but there was no statistical deference in oxygen saturation levels.

Conclusion:

Combined Dorsal penile nerve block and ventral penile block significantly reduces the pain in elective plasti-bell circumcision.

Key words: Plasti-bell circumcision, dorsal penile nerve block, ventral penile block.

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INTRODUCTION:

Historically, circumcision is proposed to be one of the oldest surgical procedure performed till today [1]. Mostly It is performed due to religious and social reasons [2], only few medical conditions necessitate Circumcision [3]. In our part of the world it is commonly performed in initial months of life. As in adult, it is painful procedure for neonates also [4]. There are many known methods to anesthetize the penile shaft in neonates. Dorsal penile nerve block is the common method used since many decades [5], other methods includes EMLA cream, subcutaneous penile ring block, oral acetaminophen [6,7]. Recent studies also demonstrate use of combined EMLA + Dorsal Penile Nerve blocks +sucrose as effective pain management in neonatal circumcision [8]. To our knowledge ventral penile block in combination to Dorsal Penile Nerve block is never been reported. Our aim of study is to further decrease the painful sensation in neonatal age and objectively assess on modified - Neonatal Infant Pain Score (NIPS) [9] Figure # 1.

METHODOLOGY:

Setting: Jeejal Mau Hospital Hyderabad

Study duration: July 2019 to Feb 2020.

All neonates electively presented for the plastibell circumcision were assessed and parents were counseled and consented for circumcision. Parents were explained about the local anesthesia and plastibell circumcision technique. Neonates were randomized on the day of procedure on balloting. All neonate's legs were modestly held by assisting nurse in straight position. In Group A, dorsal penile nerve block was given with diluted lidocaine 2% (4mg/kg) using 27 gauze needle. Local anesthesia was infiltrated at 10 and 2 o'clock position at base of the penis on dorsal aspect. In Group B along with the dorsal penile nerve block, additional anesthesia was infiltrated at ventral aspect of penile shaft just at the level of penoscrotal junction. After 5 minutes of local anesthesia,

penile shaft was cleaned with povidone solution. The main steps in plastibell circumcision are; 1- adhesolysis of preputal skin from glans, 2- small Dorsal slit, 3- Ring placement and knot tying, 4- Removal of excessive skin. During procedure, transcutaneous pulse oximeter was attached to earlobe/ thumb of neonate for monitoring of pulse and oxygen saturation. Pain was assessed using modified - Neonatal Infant Pain Score [9]. NIPS is composed of 6 components with total of 7 score, which includes facial expression (0-1), cry (0-2), breathing patterns (0-1), arms movement (0-1), legs movements (0-1) and state of arousal (0-1). In our study legs were held in straight position by assisting nurse, so leg movement component was omitted. All neonates were prescribed oral paracetamol drops and local polyfex gel application for 5 days. Data was documented on computerized sheet and analyzed with SPSS version 23. Mean was calculated for basic parameters and chi square test was applied. For comparison of NIPS and vitals t-test was applied and p value of <0.05 was considered as statistically significant.

RESULTS:

Hundred neonates were enrolled in each group. In Group A, mean age of neonates was 4.4 ± 1.6 months and in Group B mean age was 4.1 ± 1.2 months. When compared p value was statistically not significant ($p=0.09$). The mean weight in Group A was 5.2 ± 0.4 Kg and in Group B was 4.9 ± 0.6 kg, when compared $p=0.08$ (Table # 1). The mean Neonatal Infant pain score in Group A was 4.0 ± 0.3 and in Group B 2.9 ± 0.4 , when compared $p < 0.001$. The detailed NIPS scores are tabulated as Table # 2. Pulse and oxygen saturation in group A was 149 ± 70 beats/minute, 98%. And in Group B it was 131.2 ± 29.8 beats/minute and saturation of 98%. When compared both groups there was statistically significant deference in pulse rate $p < 0.001$ but there was no statistical deference in oxygen saturation levels (Table # 3).

Figure # 1

Neonatal Infant Pain Scale (NIPS)

Pain Assessment Tools Neonatal/Infant Pain Scale (NIPS)

(Recommended for children less than 1 year old) - A score greater than 3 indicates pain

Pain Assessment		Score
Facial Expression		
0 – Relaxed muscles	Restful face, neutral expression	
1 – Grimace	Tight facial muscles; furrowed brow, chin, jaw, (negative facial expression – nose, mouth and brow)	
Cry		
0 – No Cry	Quiet, not crying	
1 – Whimper	Mild moaning, intermittent	
2 – Vigorous Cry	Loud scream; rising, shrill, continuous (Note: Silent cry may be scored if baby is intubated as evidenced by obvious mouth and facial movement.	
Breathing Patterns		
0 – Relaxed	Usual pattern for this infant	
1 – Change in Breathing	Indrawing, irregular, faster than usual; gagging; breath holding	
Arms		
0 – Relaxed/Restrained	No muscular rigidity; occasional random movements of arms	
1 – Flexed/Extended	Tense, straight legs; rigid and/or rapid extension, flexion	
Legs		
0 – Relaxed/Restrained	No muscular rigidity; occasional random leg movement	
1 – Flexed/Extended	Tense, straight legs; rigid and/or rapid extension, flexion	
State of Arousal		
0 – Sleeping/Awake	Quiet, peaceful sleeping or alert random leg movement	
1 – Fussy	Alert, restless, and thrashing	

Table # 1. Mean Age and weight of neonates			
	Group A (n=100)	Group B (n=100)	p value
Age (Months)	4.4±1.6	4.1±1.2	p=0.09
Weight (Kg)	5.2±0.4	4.9±0.6	p=0.08

Table # 2. Modified - Neonatal Infant Pain Score (NIPS)								
	Adhesolysis		Dorsal Slit		Ring placement & knot tying		Removal of excessive skin	
Mean Scores	GroupA	GroupB	GroupA	GroupB	GroupA	GroupB	GroupA	GroupB
Fascial expression	0.6±0.3	0.5±0.2	0.5±0.3	0.5±0.3	0.7±0.5	0.5±0.4	0.6±0.3	0.5±0.2
Cry	0.5±0.4	0.3±0.5	0.7±0.4	0.6±0.3	1.0±0.5	0.6±0.5	0.8±0.5	0.6±0.3
Breathing pattern	0.6±0.2	0.5±0.3	0.6±0.3	0.5±0.5	0.8±0.3	0.5±0.1	0.6±0.6	0.6±0.3
Arm movements	0.5±0.3	0.5±0.4	0.4±0.5	0.5±0.1	0.6±0.4	0.5±0.3	0.4±0.3	0.5±0.6
Leg movements	##	##	##	##	##	##	##	##
State of arousal	0.6±0.4	0.5±0.4	0.4±0.3	0.4±0.2	0.8±0.6	0.5±0.4	0.4±0.6	0.4±0.5
Total Score (m)	3.7±0.1	2.9±0.3	3.8±0.3	3.0±0.7	4.9±0.3	2.8±0.5	3.7±0.4	2.9±0.3
p values	p=0.05		p=0.06		p=0.0001		p=0.08	

Table # 3. Mean Pulse and Oxygen Saturation			
	Group A (n=100)	Group B (n=100)	p value
Mean Pulse	149±70 beats/min	131.2±29.8 beats/min	p=<0.001
Mean Oxygen Sats:	98%	98%	###

DISCUSSION:

Circumcision is the commonest procedure performed in neonates [10]. Even in 2020, neonates are circumcised without affective pain control [11]. It is well hypothesized and published in literature that painful stimulation can lead to long term psychological, behavioral and physiological complications [12]. In majority of countries neonatal circumcision is performed in initial few months of life [13], which is consistent with our study's mean age of approximately 4.5months. in our part of world, plastibell circumcision is common method of circumcision in neonatal period [14,15]. Majority of patients are concerned about pain and post-circumcision discomfort [15]. There are many reported methods of anesthetization of penile skin for circumcision, dorsal penile nerve block is the commonest mode around the globe [16,7,17]. Many local anesthetics are compared in control trials and results are still debatable [18,19]. To our knowledge "ventral penile skin block" is never been reported in terms of neonatal circumcision. We infiltrated the ventral penile skin at the peno-scrotal junction. Care must be taken to avoid the needle penetration in corpus spongiosum and urethra. Another key point in lidocaine infiltration was dose distribution, out of total diluted injection volume 40% of volume was injected at 2 O'clock, 40% on 10 O'clock position and 20% volume on ventral aspect in midline at peno-scrotal junction. Our study demonstrated statistically significant pain control in group B as compare to group A having DPNB alone. In Group A we observed statistically significant higher scores of NIPS during mobilization of adhesions of preputal skin from glans and knot tying, which gives indirect evidence that the ventral skin is not affectively anesthetized with DPNB alone. Simultaneously pulse rate was also recorded statistically higher in group A neonates. All neonates were given clinic's contact numbers and asked for reporting any even explained during pre-procedure counselling. Yet till now no anesthesia related or plastibell circumcision related adverse event is reported at our clinic, but multi-centric trials can contribute much stronger evidence and settle the debate of uncertainty since decades. To over experience, combined infiltration is the way forward for pain free neonatal circumcision.

CONCLUSION:

In comparison to Dorsal Penile Nerve Block alone, combined dorsal penile nerve block and ventral penile block significantly reduces the pain in elective plastibell neonatal circumcision.

Multi-centric trials are needed to recognize combined DPNB and Ventral Penile block as standard for neonatal circumcision.

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