

# Comparison between Anesthetic Approaches with Pudendal Nerve Block on Postoperative Pain Profile after Anorectal Surgery: Our Experience at King Hussein Medical Centre

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## ABSTRACT

**Objective:** To compare between different anesthetic methods with pudendal nerve block on postoperative pain quality after various anal surgical interventions.

**Methods:** Our prospective, randomized study included 114 patients, of both sexes, aged 20-55 years, classed I physical status by the American Society of Anesthesiologists (ASA) and assigned for multiple types of anorectal surgical procedures at King Hussein Hospital, King Hussein Medical Centre, Amman-Jordan, during the period May-December 2012. Subjects were divided randomly into 4 groups. Group I patients (GI, n=28) received subarachnoid block without pudendal nerve block, group II patients (GII, n=29) received spinal block with pudendal block, group III patients (GIII, n=28) received general anesthesia without pudendal block and group IV patients (GIV, n=29) received general anesthesia with pudendal block. Evaluation of postoperative pain profile during the first postoperative 48 hours included pain rating scale (verbal McGill pain questionnaire with no, mild, moderate and severe pain analgesic requirements and duration of analgesia. P-value < 0.05 was considered as statistically significant.

**Results:** Severe pain incidence was 14.3% in group I and 3.4% in group II (P<0.05) in the first postoperative 48 hours. Severe pain was 17.9% in group III and 6.9% in group IV (P<0.05) in the first postoperative 48 hours. Mean duration of postoperative analgesia was 2.5 hours in group I and was 25.4 hours in group II (P<0.05). Mean duration of postoperative analgesia was 0.5 hours in group III and was 19.5 hours in group IV (P<0.05).

**Conclusion:** Postoperative pain relief after anorectal surgery can be prolonged if pudendal nerve block was added to general anesthesia or subarachnoid block.

**Key words:** Anesthesia: Anorectal, General, Pudendal nerve, Subarachnoid; Surgery: Pain, Postoperative: Analgesic.

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## Introduction

Pain is one of the commonest problems in addition to others occurring after surgery.<sup>(1)</sup> Anorectal surgery causes frequently severe

postoperative pain of different periods and intense use of narcotic<sup>(2)</sup> and non-opioid analgesics.<sup>(3)</sup> Although surgeons and anesthesiologists have used multiple surgical<sup>(4)</sup> and anesthetic<sup>(4,5)</sup>

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techniques, postoperative pain is still occupying a clinical and practical attention, because in some instances this type of disease forces patients to prefer the disease itself to surgery. Rawal N, *et al*<sup>(6)</sup> demonstrated that 35% of anal surgical patients had moderate to severe pain at home even with analgesics administered.

Some anal diseases have surgical indications which can be performed under general, local infiltration, regional anesthesia, and sedation or combined. Unfortunately, administered regional blocks produce a brief postoperative pain free period<sup>(7)</sup> but more than with general anesthesia.<sup>(4)</sup> Among regional blocks, pudendal nerve block was used to reduce the postoperative pain after some anal surgeries.<sup>(8)</sup> Somatic innervations of the pelvic floor and external sphincters comes from the sacral plexus (segments L4 -5 and S1-4). Knowing the pudendal nerve anatomy is very important to understand the nerve blockade technique. The pudendal nerve originates in the anterior sacral foramina, accompanied by the internal pudendal artery, leaving the pelvis through the greater ischial incisures, posterior to the sacral ligament and next to the ischial spine providing motor innervations to perineal muscles and external sphincters. The pudendal nerve divides into 3 main branches: inferior anal nerve, perineal nerve and dorsal nerve of the penis or clitoris.<sup>(10)</sup> The pudendal nerve originates from sacral nerves S2, 3 and 4. Pudendal nerve block induces a satisfactory perineal analgesia.

Pain is not just a sensory modality but is an experience. It is an unpleasant sensory and emotional experience associated with actual or potential tissue damage. Postoperative pain is caused by noxious stimulation due to injury or abnormal function of muscle or viscera. Normal pain perception depends on specialized neurons that function as receptors, detecting the stimulus and then transducing and conducting it into the central nervous system. Superficial somatic pain is due to nociceptive input arising from skin and subcutaneous tissues. It is well localized and described as a sharp, pricking, throbbing or burning sensation. Deep somatic pain arises from muscles, tendons and others. It has a dull, aching quality and is less well localized.<sup>(11)</sup>

The objective of our investigation was to compare between different anesthetic techniques

in terms of postoperative pain parameters after anal surgery in our Jordanian population.

## Methods

This prospective, randomized investigation enrolled 114 subjects, of both genders, aged 20-55 years, classed I by the American Society of Anesthesiologists and scheduled for different types of anal surgical interventions performed in lithotomy position at King Hussein hospital, King Hussein Medical Centre, Amman-Jordan, during the period May-Dec 2012, after obtaining an approval from our local ethics and research committee of the Jordanian Royal Medical Services and a written informed consent from all participants.

Subjects were divided into 4 groups in a random manner. Group I patients (GI, n=28) received subarachnoid block without pudendal nerve block, group II patients (GII, n=29) received spinal block with pudendal block, group III patients (GIII, n=28) received general anesthesia without pudendal block and group IV patients (GIV, n=29) received general anesthesia with pudendal block.

General intravenous anesthesia was induced using fentanyl 2mcg/kg, propofol 2mg/kg and cisatracurium 0.15mg/kg. Maintenance of gaseous anesthesia was performed using 1MAC of sevoflurane mixed with oxygen 33%.

Subarachnoid block (saddle block) was achieved in the sitting position. Subjects received 1ml (5mg) of heavy bupivacaine 0.5% (Marcaine spinal 0.5% heavy bupivacaine Hcl, 5mg/ml-4 ml, Astra-zeneca) at L3-L4 interspace using the median route with a 25 G spinal needle. Patients were left in the sitting position for 5 minutes after which they were returned to the supine and lithotomy position. For all pudendal nerve block patients, a mixture of plain bupivacaine 0.25% (bucaine 0.25%, 50mg/20ml, bupivacaine Hcl 2.5mg/ml, Hikma pharmaceuticals, Amman-Jordan) and lidocaine 2% (lidocaine, 100mg/5ml, lidocaine Hcl injection 2%, hameln pharmaceuticals ltd) was administered in a total volume of 0.7 ml/kg (or 20ml) at each side of pudendal nerves.<sup>(12)</sup> The procedure used transperineal access and the puncture site was medial to ischial tuberosity. Injection is done percutaneously posterior to the ischial spine at

the attachment of the sacrospinous ligament. The ischial spine can be palpated transrectally or transvaginally. In groups where pudendal nerve block was used, half patients were given fentanyl 100 mcg (fentanyl 50 mcg/ml, Martindale pharmaceuticals, 100 mcg/2ml) added to the previous mixture total volume: Group II b (GII b, n=15) and group IV b (GIV b, n=15). During lithotomy position, two posterior injections were performed at 4 and 8 o'clock, 3cm from the anal verge by advancing a 22 G, 10cm needle a perpendicular distance of 7-10cm<sup>(12)</sup> when injection is achieved. PNB was performed by the same surgeon in our investigation.

All patients were monitored for blood pressure, heart rate and oxygen saturation and for general anesthesia patients the end tidal CO<sub>2</sub> was monitored in addition. Postoperative pain evaluation included pain rating scale for pain severity score using the McGill pain questionnaire (MPQ) with no pain, mild, moderate and severe pain.<sup>(11)</sup> This scale was used at 8 hours interval for the first 24 postoperative hours then at 48 postoperative hours. Postoperative analgesic requirements during the first postoperative 48 hours were recorded. Sodium diclofenac 75mg was administered intramuscularly on demand. Postoperative period of pain relief was recorded during the first postoperative 48 hours whether at hospital or at home.

Simple descriptive statistics (mean, frequency and percentages) in addition to Chi-square, t-tests and ANOVA were used to describe and analyze the study variables.

## Results

There were no significant differences between the 4 groups in terms of number, age, gender, ASA class and weight (Table I).

At 48 hours, severe pain frequency was recorded as 14.3% and 3.4% in groups I and II, respectively (P<0.05). Severe pain was 17.9% and 6.9% in groups III and IV, respectively (P<0.05). No pain was recorded as 35.7% and 37.9% at 8 hours in groups I and II, respectively (P>0.05). No pain incidence was 21.4% and 41.5% at 8 hours in groups III and IV, respectively (P<0.05). Pudendal nerve block decreased the severe pain

score significantly at 8 hours postoperatively (P<0.05) by 11.1% compared to the other time intervals. At 8 hours, pudendal nerve block decreased the severe pain frequency by 21.8% compared to the other time intervals (P<0.05). No pain decrease was from 8 hours to 48 hours by: 14.3%, 6.9%, 3.5% and 10.6% in groups I, II, III and IV, respectively. Mild pain score increased from 8 hours to 48 hours by: 17.9%, 20.7%, 25% and 17.3% in groups I, II, III and IV, respectively. (Tables II and III). Moderate pain from 8 to 48 hours increased only in group I by 3.5% and decreased by 6.9%, 7.1% and 3.4% in groups II, III and IV, respectively. Severe pain from 8 to 48 hours decreased by 7.1%, 6.9%, 14.2% and 3.4% in groups I, II, III and IV, respectively.

Mean duration of postoperative analgesia was 2.5h, 25.4h, 0.5h and 19.5h in groups I, II, III and IV, respectively. It was 22.2h and 28.5h in groups GIIa and GIIb, respectively (P>0.05). This duration was 16.3h and 22.6h in groups GIVa and GIVb, respectively (p>0.05). The most increased pain relief duration was significantly present in groups where fentanyl was used. Mean duration of postoperative analgesia more than 24 hours was 0%, 42.9%, 66.7%, 0%, 28.6% and 60% in groups I, IIa, IIb, III and IVa, IVb, respectively. (Tables II and III)

Postoperative analgesic needs in the first postoperative 48 hours was 100% in group III where general anesthesia was used while it was 89.3% in group I where subarachnoid block was used (p>0.05). Third and fourth doses were not used in groups II and IV. In groups where fentanyl was used, first dose administration was 66.7% and 75%, in groups IIb and IV b, respectively. In groups where pudendal nerve block was used, group IV needed 44.8% of analgesics while group II required 31.03% analgesics. (Tables II and III)

Table IV shows the comparison between groups II and IV without taking fentanyl in consideration, where we can see that severe pain score was 6.9% and 17.9% in groups IV and II, respectively (P<0.05), at 48 hours. There was no significant difference regarding no pain score at 8 hours (37.9% and 41.5%, in groups II and IV, respectively (P>0.05). (Table IV).

**Table I:** Patients characteristics (No, range-mean-)

	GI	GII		GIII	GIV		P
		a	b		a	b	
No	28	14	15	28	14	15	>0.05
ASA(no)	28	14	15	28	14	15	>0.05
Gender(no)							
M	20	8	9	22	10	9	>0.05
F	8	6	6	6	4	6	
Age(years)							
20-40 yr	18	9	10	20	8	9	>0.05
41-55 yr	10	6	5	8	6	6	
Range(mean)							
Weight(kg)							
60-70kg	19	10	11	17	9	9	>0.05
71-80 kg	9	4	4	11	5	6	
Range(mean)							
Anesth method	SAB*	SAB+PNB-F**	SAB+PNB+F^	GA^^	GA+PNB-F°	GA+PNB+F°°	

\*Subarachnoid block alone

^Subarachnoid block with pudendal block with fentanyl

°General anesthesia with pudendal block with no fentanyl

\*\*Subarachnoid block with pudendal block with no fentanyl

^^General anesthesia alone

°°General anesthesia with pudendal block with fentanyl

**Table II.a:** Postoperative pain profile, GI (No., %, mean)

		GI (SAB)			
No		28			
Pain score		0	mild	moderate	severe
8h		10(35.7%)	7(25%)	5(17.9%)	6(21.4%)
16h		7(25%)	10(35.7%)	3(21.4%)	5(17.9%)
24h		6(21.4%)	11(39.3%)	7(25%)	4(14.3%)
48h		6(21.4%)	12(42.9%)	6(21.4%)	4(14.3%)
Analgesia duration(mean)		2.5 h			
1-2h		25(89.3%)			
2-4h		3(10.7%)			
>24h		0%			
Analgesic needs		yes	25(89.3%)		
1 dose		3(12%)			
2 doses		6(24%)			
3 doses		7(28%)			
4 doses		9(36%)			
no		3(10.7%)			

**Table II.b:** Postoperative pain profile GII (cont.)

No.	GII(SAB+PNB)								
	GII a(-F) 14				GIIb(+F) 15				
Pain score	0	mild	moderate	severe	0	mild	moderate	severe	
8h	5(35.7%)	5(35.7%)	2(14.3%)	2(14.3%)	6(40%)	7(46.7%)	1(6.7%)	1(6.7%)	
16h	5(35.7%)	5(35.7%)	2(14.3%)	2(14.3%)	6(40%)	7(46.7%)	1(6.7%)	1(6.7%)	
24h	4(28.6%)	6(42.9%)	3(21.4%)	1(7.1%)	7(46.7%)	7(46.7%)	1(6.7%)	0%	
48h	4(28.6%)	8(57.1%)	1(7.1%)	1(7.1%)	5(33.3%)	10(66.7%)	0%	0%	
Analgesia duration(mean)h		22.2h				28.5h			
8-12h		1(7.1%)				1(6.7%)			
13-18h		3(21.4%)				1(6.7%)			
19-24h		4(28.6%)				3(20%)			
>24h		6(42.9%)				10(66.7%)			
Analgesic		yes	5(35.7%)			4(26.7%)			
1 dose		3(60%)			3(75%)				
2 doses		2(40%)			1(25%)				
3 doses		0%			0%				
4 doses		0%			0%				
no		9(64.3%)			11(73.3%)				

**Table III.a:** Postoperative pain profile GIII (No., %, mean)

		GIII(GA)			
No.		28			
Pain score		0	mild	moderate	severe
	8h	6(21.4%)	4(14.3%)	9(32.1%)	9(32.1%)
	16h	5(17.9%)	6(21.4%)	9(32.1%)	8(28.6%)
	24h	5(17.9%)	10(35.7%)	8(28.6%)	5(17.9%)
	48h	5(17.9%)	11(39.3%)	7(25%)	5(17.9%)
Analgesia duration (mean) h		0.5h			
	1-2h	22(78.6%)			
	2-4h	6(21.4%)			
	>24h	0%			
Analgesic needs	yes	28(100%)			
	1 dose	4(14.2%)			
	2 doses	8(28.6%)			
	3 doses	8(28.6%)			
	4 doses	8(28.6%)			
	no	0%			

**Table III.b:** Postoperative pain profile GIV (cont).

		GIV(GA+PNB)							
		GIVa(-F)			GIVb(+F)				
No.		14			15				
Pain score		0	mild	Moderat	severe	0	mild	moderate	severe
	8h	5(35.7%)	5(35.7%)	2(14.3%)	2(14.3%)	7(46.7%)	6(40%)	1(6.7%)	1(6.7%)
	16h	4(28.6%)	6(42.9%)	2(14.3%)	2(14.3%)	6(40%)	7(46.7%)	1(6.7%)	1(6.7%)
	24h	4(28.6%)	5(35.7%)	3(21.4%)	2(14.3%)	6(40%)	7(46.7%)	2(13.3%)	0%
	48h	4(28.6%)	6(42.9%)	2(14.3%)	2(14.3%)	5(33.3%)	10(66.7%)	0%	0%
Analgesia duration (mean)		16.3h			22.6h				
	8-12h	1(7.1%)			1(6.7%)				
	13-18h	5(35.7%)			2(13.3%)				
	19-24h	4(28.6%)			3(20%)				
	>24h	4(28.6%)			9(60%)				
Analgesic	yes	7(50%)			6(40%)				
	1 dose	5(71.4%)			4(66.7%)				
	2 doses	2(28.6%)			2(33.3%)				
	3 doses	0%			0%				
	4 doses	0%			0%				
	no	7(50%)			9(60%)				

**Table IV:** General postoperative pain profile in PNB groups. (No., %, mean)

		GII				GIV			
no		29				29			
Pain score		0	mild	moderate	severe	0	mild	moderate	severe
	8h	11(37.9%)	12(41.5%)	3(10.3%)	3(10.3%)	12(41.5%)	11(37.9%)	3(10.3%)	3(10.3%)
	16h	11(37.9%)	12(41.5%)	3(10.3%)	3(10.3%)	10(34.6%)	13(44.8%)	3(10.3%)	3(10.3%)
	24h	11(37.9%)	13(44.8%)	4(13.8%)	1(3.4%)	10(34.6%)	12(41.5%)	5(17.2%)	2(6.9%)
	48h	9(31.03%)	18(62.2%)	1(3.4%)	1(3.4%)	9(31.03%)	16(55.7%)	2(6.9%)	2(6.9%)
Mean		25.4h				19.5h			
	8h	2(6.9%)				2(6.9%)			
	16h	4(13.8%)				7(24.1%)			
	24h	7(24.1%)				7(24.1%)			
	48h	16(55.2%)				13(44.8%)			
	yes	9(31.03%)				13(44.8%)			
	1D	6(20.7%)				9(31.03%)			
	2D	3(10.3%)				4(13.8%)			
	3D	0%				0%			
	4D	0%				0%			
	no	20(68.9%)				16(55.2%)			

**Table V:** Analgesia duration in all groups

	GI	GII		GIII	GIV	
	SAB	-F	+F	GA	-F	+F
Mean(h)	2.5	22.2	28.5	0.5	16.3	22.6
1-2h	25(89.3%)			22(78.6%)		
2-4h	3(10.7%)			6(21.4%)		
8-12h		1(7.1%)	1(6.7%)		1(7.1%)	1(6.7%)
12-18h		3(21.4%)	1(6.7%)		5(35.7%)	2(13.3%)
18-24h		4(28.6%)	3(20%)		4(28.6%)	3(20%)
>24h	0%	6(42.9%)	10(66.7%)	0%	4(28.6%)	9(60%)

## Discussion

Postoperative pain relief after anal surgical procedures could be obtained by different anesthetic methods but every method has its own advantages and disadvantages. Our study demonstrated that subarachnoid block or general anesthesia combined with pudendal nerve block (especially if fentanyl was added to the mixture for pudendal nerve block) induced a significant pain relief at the first 8 and 24 hours postoperatively with a significant decrease in postoperative analgesic requirements.

Our results were in accordance with the results of Naja Z *et al.*,<sup>(9)</sup> Sherif A, *et al.*<sup>(5)</sup> and Luiz EI *et al.*<sup>(6)</sup> Luiz *et al.* demonstrated that by using spinal anesthesia alone, mean analgesia duration was 3.7h with residual perineal anesthesia in 0% at all time intervals. Severe pain score was 8% at 24 postoperative hours requiring postoperative analgesics in 100% of cases with 45% using 4 or more doses. When Luiz, *et al* used PNB with SAB, the mean analgesia duration was 23.4h with residual perineal anesthesia in 41% for more than 24 postoperative hours. Severe pain score decreased to 0% at 24 postoperative hours needing 34% postoperative analgesics with 0% using 4 or more doses.<sup>(6)</sup> Sherif A *et al* showed that by using general anesthesia in anorectal surgery, severe pain score was 30% and moderate pain score was 70% at 24 postoperative hours, requiring postoperative analgesics in 60% of cases. When the same author used PNB with general anesthesia, severe pain score decreased to 0% and moderate pain score decreased to 25%, requiring no postoperative analgesics in 100% of cases.<sup>(5)</sup> Combining pudendal nerve block to general anesthesia may prolong the pain free duration in comparison to plain local anesthetics.<sup>(13)</sup> Combining fentanyl to local anesthetic administered via the pudendal nerve block may prolong the duration of pain relief and

peripheral nerve block to more than 48 hours.<sup>(5)</sup> This prolonged pain relief can be explained by the decrease in nociceptive plasticity in the central nervous system and in the local action at the injured perianal nerves.<sup>(14)</sup>

Although local anesthesia with sedation is still the most usual method for most of anal procedures, however, postoperative pain remains untreated well. Doses from 1-3 ml of bupivacaine 0.5% injected into the base of each hemorrhoid about 10 minutes before the incision produced analgesia 10 times longer.<sup>(15)</sup> Spinal bupivacaine 0.75% in 8.25% dextrose in 4 mg for perineal surgery induces a 90-120 minutes analgesia duration while spinal lidocaine 5% in 7.5% glucose in 25 mg for perineum surgery induces a 60-75 minutes analgesia duration.<sup>(11)</sup> Pain after discharge from hospital is attributed to the level of pain immediately after the surgery and therefore the goal is to eradicate pain in the post anesthesia care unit. Perineum is an intensely sensitive area and the surgical approach of anal problems produces a painful stimulus which remains for several days. Functional disorders of the rectum, bladder and sexual issues are produced not only by the surgery but also by the insufficient management of postoperative pain. Pain is a subjective experience influenced by psychological and cultural variables. Clear definitions are necessary because pain may be described in terms of tissue destruction or bodily -emotionally reaction.

Descriptive scales such as mild, moderate and severe pain are noncontinuous. The McGill pain questionnaire attempts to define the pain in 3 major dimensions: sensory discriminative, motivational affective and cognitive evaluative.

Pudendal nerve block is indicated for perineal surgery as obstetric and anal surgery. Pudendal nerve block may be done through transperineal or transvaginal techniques. It is useful in evaluating

patients with perineal pain. It courses between the sacrospinous and the sacrotuberous ligaments to reach the perineum. Reliable quantization of pain severity helps determine therapeutic interventions and evaluate the efficacy of management. Unintentional sciatic block is common complication. The pudendal nerve is a predominantly sensory nerve arising from S2-4 nerve roots. It contains some motor fibers which can innervate the external anal and external urethral sphincters. The nerve follows the posterior aspect of the sacrospinous ligament and then passes anterior to the sacrotuberous ligament. The pudendal nerve is at its closest association with the sciatic nerve between the piriformis and coccygeus muscles just cephalad to the ischial spine. The nerve then passes around the ischial spine before entering the pudendal canal of Alcock, which is a space between the obturator internus fascia on the lateral wall of the ischioanal fossa. The pudendal nerve has 3 branches, the inferior rectal, peroneal and dorsal nerve of the penis/clitoris. The first branch (exits the nerve just before or inside of Alcock's canal) innervates the skin around the anus. The second branch has a deep motor portion and 2 sensory portions, the medial and lateral labial (scrotal) branches. The third branch runs along the skin of the penis/clitoris, innervating the overlying skin. Perianal perineal pain is a debilitating condition, which if caused by affected pudendal, has pain along the anatomical distribution of the nerve, pain is aggravated by sitting, pain doesn't awake the patient at night.<sup>(1)</sup> Although pudendal nerve block can be performed using C-arm fluoroscopy to target the ischial spine especially transvaginally, ultrasound guidance using transperineal approach targeting the pudendal artery and CT, MRI guidance targeting the nerve as it passes between the sacrospinous and sacrotuberous ligaments with risk of sciatic nerve block, we used the simplest technique with no complications.

Postoperative perianal pain is very severe with pain described like passing bits of broken glass. Intense postoperative pain prolongs convalescence resulting in a typical sick-leave period of 2-3 weeks. Finding a technique with significant decreased postoperative pain and more rapid recovery is important for all parties participated in surgery. Although our study is a

randomized trial, there is possibility for bias to occur.

## Conclusion

Combining pudendal nerve block with subarachnoid block or general anesthesia especially with fentanyl added to mixture of PNB in anorectal surgical interventions produces a significant postoperative pain control

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