

A COMPARATIVE STUDY OF EFFECTIVENESS OF LANDMARK TECHNIQUE VS ULTRASOUND GUIDED TECHNIQUE FOR ILIOINGUINAL/ILIOHYPOGASTRIC NERVE BLOCK IN PEDIATRIC PATIENTS IN TERTIARY CARE HOSPITAL

¹Dr. G Deepika, ²Dr. Adithi Devi E, ³Dr. Neelima Junjunuru, ⁴Dr. PV Shiva

¹Post Graduate Scholar, Department of Anesthesiology, Osmania Medical College, Niloufer Hospital, Hyderabad, Telangana, India

^{2,3}Assistant Professor, Department of Anesthesiology, Osmania Medical College, Niloufer Hospital, Hyderabad, Telangana, India

⁴Professor, Department of Anesthesiology, Osmania Medical College, Niloufer Hospital Hyderabad, Telangana, India

Corresponding Author:

Dr. PV Shiva

Abstract

Background, Aim and Objectives: Using an innovative anaesthetic approach, ultrasound-guided ilioinguinal and iliohypogastric nerve block, postoperative discomfort can be reduced. In a tertiary care institution, a comparison of the effectiveness of the landmark technique and the ultrasound-guided technique was made on paediatric patients undergoing ilioinguinal/iliohypogastric nerve blocks. The main goal is to analyse the effectiveness of analgesia during the intraoperative period. This is done by measuring the patient's hemodynamics at any time, including their blood pressure, heart rate, spo2, and electrocardiogram. After surgery, the pain is measured using the VAS score. Comparing the complications and the quantity of rescue analgesia in the two groups is the secondary goal.

Methods: Included in the inclusion criteria were 60 children between the ages of 2 and 8 who met the physical status requirements of the American Society of Anesthesiologists, as well as informed agreement from the parents and approval from the institution's ethics committee. Participants in the trial were posted for elective hernia repair. Any ILIH contraindication, such as a surgical scar or deformed anatomy at the injection site, qualified as an exclusion. ASA grade III. Patients needing emergency surgery, those with bleeding disorders, sepsis, skin lesions or wounds at the proposed incision site, the parents' reluctance, or infections at the injection site. Recognised allergy to LA kids with a history of heart, lung, liver, or kidney illness. All these patients were excluded from study.

Results and Conclusion: In our investigation, group B participants had an ultrasound-guided 0.3ml/kg bupivacaine block of the ilioinguinal and iliohypogastric nerves, while group A participants received a 0.3kl/kg bupivacaine block of the iioinguinal and iiohypogastric nerves using the landmark technique. In this study, we discovered that Group B individuals had lower visual analogue scores, prolonged postoperative analgesia and decreased analgesic

intake within the first twelve hours following surgery. Based on the results of our investigation, we discovered a unique and highly successful technique for postoperative pain treatment in inguinal hernia patients: ultrasound guided ilioinguinal and iliohypogastric nerve block utilising long acting local anaesthetic.

Keywords: Ultrasound guided technique, ilioinguinal, iliohypogastric nerve, pediatric patients and anaesthetic approach

Introduction

In children, surgical procedures that are carried out in the groin include inguinal herniotomy, hydrocele repair (hydrocelectomy) and orchidopexy. These are commonly treated as day case operations but for these children to be discharged early, they must be provided with adequate analgesia in the post-operative period.

Regional anaesthesia is a cornerstone of modern paediatric anaesthesia. Most of the paediatric anaesthetists combine general and regional anaesthesia to provide superior and long-lasting analgesia whilst the risk of respiratory depression that comes with opioids is avoided.

Even though there has been major progress in pain assessment and management, pain in the postoperative period has continued to be a clinical problem because the experience of pain has been reported as a common problem in clinical practice. Of the millions of children who undergo surgery every year, a majority will experience significant pain in the hospital. In the management of pain, there is no single optimal method that can be used to achieve the best analgesia. Thus, a multimodal approach is advised, as inadequately treated acute pain can lead to chronic pain later in life. Pain in children can be detrimental and leads to psychological stress to both the patient and parents. Following hospitalization, children may experience long term psychological disturbances such as sleep or eating disorders, separation anxiety, temper tantrums or new onset enuresis ^[1]. The best tool to avoid the occurrence of these negative behaviours remain preventive and include a comprehensive approach that aims at minimizing psychological distress and encompasses all the time intervals of the hospital stay from admission till discharge.

Hence there is a need to establish the prevailing peri-operative pain scores in this population and whether the nerve block done with the landmark technique offers any additional analgesia.

An unacceptable level of pain will produce tachycardia, hypertension, vasoconstriction and splinting of the affected part. Opioids, non-steroidal anti-inflammatory drugs and analgesics are commonly used as part of multimodal analgesia to treat postoperative pain. However, they are often associated with several undesirable effects.

Ultrasound-guided ilioinguinal and iliohypogastric nerve block presents a novel anaesthetic technique in relieving postoperative pain. The effectiveness of this 1 technique in relieving postoperative pain following inguinal hernia surgeries was evaluated in this study.

Need for the study

A substantial component of pain experienced by children after inguinoscrotal surgery is due to abdominal wall incision.

Effective pain control can decrease the opioid requirements intraoperatively and post-operative rescue analgesia and accelerate recovery from surgery and improve patient comfort.

Aim of the study

A comparative study of effectiveness of landmark technique v/s ultrasound-guided technique for ilioinguinal/ iliohypogastric nerve block in paediatric patients in tertiary care hospital.

Objectives of the study

Primary objective is to evaluate the adequacy of analgesia during intra operative period which is assessed by

- a) Hemodynamic monitoring with parameters such as (blood pressure and heart rate), spo2, ECG.
- b) Any moment in the patient.

Post-Operatively the pain is assessed by vas score

Secondary objective is to compare the complications and the amount of rescue analgesia in both the groups.

Materials and Methods

After Institutional Ethics Committee approval and informed consent from parents, inclusion criteria include 60 children in the age group of 2years - 8 years and who belonged to the American Society of Anesthesiologists physical status posted for elective hernia repair were enrolled in the study.

- 1) The exclusion criteria were any contraindication to ILIH, namely surgical scar or distorted anatomy at the site of injection.
- 2) ASA grade III or greater.
- 3) Patients with bleeding diathesis, sepsis, skin lesions or wounds at the site of proposed incision.
- 4) Patients requiring emergency surgery.
- 5) Parents refusal.
- 6) Infection at the injection site.
- 7) Known allergy to LA children with known cardiovascular, respiratory, hepatic, or renal disease.

Randomization was done using the closed envelope technique to divide the patients into two groups. The study was carried out in the pediatric surgery operation theatre of a tertiary care referral hospital, and the postoperative data were collected in the surgical ward.

Patients were evaluated pre operatively, and Induction was done using sevoflurane and intravenous (i.v.) access was established; premedication done with glycopyrrolate and fentanyl i.v. after achieving i.v. access. The airway was secured using an appropriate size laryngeal mask airway (LMA). Anaesthesia was maintained using a 50:50 mixture of N2O and oxygen along with sevoflurane. Spontaneous ventilation was established. Intraoperatively, patients are monitored for HR, NIBP, SPO2, ECG. The patients who are randomly divided into two groups received, GROUP A (control)-landmark technique with 0.3ml/kg of 0.25% of bupivacaine GROUP B (nerve block case)-Ultrasound-guided nerve block with 0.3ml/kg of 0.25% of bupivacaine In Group B, after skin preparation, ILIH block

was performed under ultrasonographic guidance with a portable ultrasound unit and a linear 8-5 MHz probe. Once external oblique, internal oblique and transverses abdominis muscles were visualized medial to the anterior superior iliac spine, the block was performed using a 22G hypodermic needle and in-plane technique. After negative aspiration for blood, 0.3 mL.kg⁻¹ of 0.25% bupivacaine was administered under direct USG guidance.

Intraoperatively, patients are monitored for the above-told vitals and also observed for any patient movement. Postoperatively after removal of supraglottic airway pain score is evaluated along with visual analogue scale score till the time of the rescue analgesia is required.

Statistical analysis

Data was analysed by Microsoft Excel and Graph pad prism software. Data were summarized by Mean \pm SD for continuous data, Median \pm IQR (Inter-Quartile Range) for score data and percentages for categorical data. The comparison between two groups was done by unpaired t-test for continuous normal data and Mann Whitney U test for continuous non-normal data/score data. The comparison between the two groups was done by Fisher's exact test for categorical data. All p-values less than 0.05 were considered statistically significant.

Table 1: The comparison between case and control groups for the parameter age (years)

Groups	N	Minimum	Maximum	Mean	SD	P-Value
Control	30	2	8	4.2	1.9	0.784
Case	30	2	8	4.0	1.8	

The minimum and maximum age are 2 and 8 years in control and case groups. The Mean \pm SD age is 4.2 \pm 1.9 years in the control group and the Mean \pm SD age is 4.0 \pm 1.8 years in the case group. There is no significant difference between control and case groups for the parameter age (in years).

Table 2: The comparison between control and case groups for the parameter gender

Groups		Gender		Total	P-value
		Female	Male		
Groups	Control	3	27	30	1.000
	Case	4	26	30	

The female and male is 3 (10%) and 27 (90%) in control group and the female and male is 4(13.3%) and 26 (86.7%). There is no significant difference between control and case groups for the parameter gender.

Table 3: The comparison between control and case groups for the parameter weight (kg)

Groups	N	Minimum	Maximum	Mean	SD	P-Value
Control	30	8	36	14.9	5.9	0.469
Case	30	9	32	16.1	6.2	

The minimum and maximum weight is 8 kg and 36 kg in control group and the minimum and maximum weight are 9 kg and 32 kg in case group. The Mean \pm SD weight is 14.9 ± 5.9 kg in control group and the Mean \pm SD weight is 16.1 ± 6.2 kg in case group. There is no significant difference between control and case groups for the parameter weight (kg).

Table 4: The comparison between control and case groups for the parameter intra operative heart rate in before induction, after securing airway, before incision, after incision, post extubation

Parameter	Groups	N	Minimum	Maximum	Mean	SD	P-Value
Before Induction	Control	30	95	140	114.4	11.1	0.767
	Case	30	94	139	115.2	11.5	
After Securing Airway	Control	30	110	145	125.5	9.0	0.028
	Case	30	103	144	119.9	10.2	
Before Incision	Control	30	108	144	122.6	10.0	0.020
	Case	30	102	142	116.4	10.1	
After Incision	Control	30	105	144	121.5	10.1	0.035
	Case	30	101	143	115.8	10.4	
Post Extubation	Control	30	102	148	118.2	11.0	0.025
	Case	30	99	136	112.1	9.7	

The minimum and maximum of before induction intraoperative heart rate is 95 and 140 in the control group. The minimum and maximum of before induction intraoperative heart rate is 94 and 139 in the case group. The Mean \pm SD before induction intra operative heart rate is 114.4 ± 11.1 in control group. The Mean \pm SD of before induction intra operative heart rate is 115.2 ± 11.5 in case group. The minimum and maximum of after Securing Airway intra operative heart rate is 110 and 145 in control group. The minimum and maximum of after Securing Airway intra operative heart rate is 103 and 144 in case group. The Mean \pm SD of after Securing Airway intra operative heart rate is 125.5 ± 9.0 in control group. The Mean \pm SD of after Securing Airway intra operative heart rate is 119.9 ± 10.2 in case group. The minimum and maximum of Before Incision intraoperative heart rate is 108 and 144 in the control group. The minimum and maximum of Before Incision intraoperative heart rate is 102 and 142 in the case group. The Mean \pm SD before Incision intraoperative heart rate is 122.6 ± 10.0 in the control group. The Mean \pm SD of before Incision intraoperative heart rate is 116.4 ± 10.1 in the case group. The minimum and maximum of After Incision intraoperative heart rate is 105 and 144 in the control group. The minimum and maximum of After Incision intraoperative heart rate is 101 and 143 in the case group. The Mean \pm SD after Incision intraoperative heart rate is 121.5 ± 10.1 in the control group. The Mean \pm SD after Incision intraoperative heart rate is 115.8 ± 10.4 in the case group.

The minimum and maximum Post Extubation intraoperative heart rate are 102 and 148 in the control group. The minimum and maximum of Post Extubation intraoperative heart rate are 99 and 136 in the case group. The Mean \pm SD of Post Extubation intraoperative heart rate is 118.2 ± 11.0 in the control group. The Mean \pm SD of Post Extubation intraoperative heart rate is 112.1 ± 9.7 in the case group. There is no significant difference between control and case

groups for the parameter intraoperative heart rate before induction. There is a significant difference between control and case groups for the parameter intraoperative heart rate in After Securing Airway, Before Incision, After Incision, and Post Extubation.

Table 5: The comparison between control and case groups for the parameter any movement

		Any Movement		Total	P-value
		Yes	No		
Groups	Control	4	26	30	0.112
	Case	0	30	30	

The any movement 'yes' is 4 (13.3%) and 0 in control and case groups. The any movement 'no' is 4 (86.7%) and 30 (100%) in control and case groups. There is no significant difference between control and case groups for the parameter any movement.

Table 6: The comparison between control and case groups for the parameter intra operative heart rate in 10, 15, 20 minutes

Time points	Groups	N	Minimum	Maximum	Mean	SD	P-Value
10 Minutes	Control	30	102	148	117.7	10.6	0.035
	Case	30	100	135	112.1	9.7	
15 Minutes	Control	30	98	146	116.2	10.5	0.020
	Case	30	95	134	109.9	9.9	
20 Minutes	Control	30	96	144	114.8	11.0	0.028
	Case	30	92	132	108.6	10.3	

The minimum and maximum 10 minutes of intra operative heart rate is 102 and 148 in control group. The minimum and maximum 10 minutes of intra operative heart rate is 100 and 135 in case group. The Mean \pm SD 10 minutes of intra operative heart rate is 117.7 ± 10.6 in control group. The Mean \pm SD 10 minutes of intra operative heart rate is 112.1 ± 9.7 in case group. The minimum and maximum 15 minutes of intra operative heart rate is 98 and 146 in control group.

The minimum and maximum 15 minutes of intra operative heart rate is 95 and 134 in case group. The Mean \pm SD 15 minutes of intra operative heart rate is 116.2 ± 10.5 in control group. The Mean \pm SD 15 minutes of intra operative heart rate is 109.9 ± 9.9 in case group. The minimum and maximum 20 minutes of intra operative heart rate is 96 and 144 in control group.

The minimum and maximum 20 minutes of intra operative heart rate is 92 and 132 in case group. The Mean \pm SD 20 minutes of intra operative heart rate is 114.8 ± 11.0 in control group. The Mean \pm SD 20 minutes of intra operative heart rate is 108.6 ± 10.3 in case group. There is significant difference between control and case groups for the parameter intra operative heart rate in 10, 15, 20 minutes.

Table 7: The comparison between control and case groups for the parameter intra operative MAP blood pressure in Pre-OP, before induction, after securing airway, before incision, after incision, post extubation

Parameter	Groups	N	Minimum	Maximum	Mean	SD	P-Value
Pre-OP	Control	30	64	77	68.4	3.2	0.076
	Case	30	63	75	70.0	3.8	
Before Induction	Control	30	58	75	67.6	4.0	0.077
	Case	30	61	75	69.4	3.8	
After Securing Airway	Control	30	68	79	72.7	3.3	0.031
	Case	30	63	77	70.7	4.0	
Before Incision	Control	30	64	78	71.2	4.1	0.034
	Case	30	59	76	69.0	3.8	
After Incision	Control	30	64	78	70.7	4.8	0.025
	Case	30	60	74	68.2	3.7	
Post Extubation	Control	30	62	80	70.5	5.4	0.031
	Case	30	59	75	67.8	4.1	

The minimum and maximum of pre-op intra operative MAP blood pressure is 64 and 77 in control group. The minimum and maximum of pre-op intra operative MAP blood pressure are 63 and 75 in case group. The Mean \pm SD of pre-op intra operative MAP blood pressure is 68.4 ± 3.2 in control group. The Mean \pm SD of pre-op intra operative MAP blood pressure is 70.0 ± 3.8 in case group. The minimum and maximum of before induction intra operative MAP blood pressure is 58 and 75 in control group. The minimum and maximum of before induction intra operative MAP blood pressure is 61 and 75 in case group. The Mean \pm SD of before induction intra operative MAP blood pressure is 67.6 ± 4.0 in control group. The Mean \pm SD of before induction intra operative MAP blood pressure is 69.4 ± 3.8 in case group. The minimum and maximum of after securing Airway intra operative MAP blood pressure is 68 and 79 in control group.

The minimum and maximum of after securing Airway intra operative MAP blood pressure is 63 and 77 in case group. The Mean \pm SD of after securing Airway intra operative MAP blood pressure is 72.7 ± 3.3 in control group. The Mean \pm SD of after securing Airway intra operative MAP blood pressure is 70.7 ± 4.0 in case group. The minimum and maximum of Before Incision intra operative MAP blood pressure is 64 and 78 in control group. The minimum and maximum of Before Incision intra operative MAP blood pressure is 59 and 76 in case group. The Mean \pm SD of before Incision intra operative MAP blood pressure is 71.2 ± 4.1 in control group. The Mean \pm SD of before Incision intra operative MAP blood pressure is 69.0 ± 3.8 in case group.

The minimum and maximum of After Incision intra operative MAP blood pressure is 64 and 78 in control group. The minimum and maximum of After Incision intra operative MAP blood pressure is 60 and 74 in case group. The Mean \pm SD of after Incision intra operative MAP blood pressure is 70.7 ± 4.8 in control group. The Mean \pm SD of after Incision intra operative MAP blood pressure is 68.2 ± 3.7 in case group. The minimum and maximum of Post Extubation intra MAP blood pressure is 62 and 80 in control group. The minimum and maximum of Post Extubation intra operative MAP blood pressure is 59 and 75 in case group. The Mean \pm SD of Post Extubation intra operative MAP blood pressure is 70.5 ± 5.4 in

control group. The Mean \pm SD of Post Extubation intra operative MAP blood pressure is 67.8 ± 4.1 in case group.

There is no significant difference between control and case groups for the parameter intra operative MAP blood pressure in pre-op, Before Induction. There is significant difference between control and case groups for the parameter intra operative MAP blood pressure in After Securing Airway, Before Incision, After Incision, and Post Extubation.

Table 8: The comparison between control and case groups for the parameter intra operative MAP blood pressure in 10, 15, 20 minutes

Time points	Groups	N	Minimum	Maximum	Mean	SD	P-Value
10Minutes	Control	30	58	78	67.6	5.6	0.778
	Case	30	60	74	67.1	3.7	
15Minutes	Control	30	62	78	69.2	5.5	0.038
	Case	30	59	73	66.4	3.7	
20Minutes	Control	30	61	78	69.0	5.6	0.027
	Case	30	59	72	66.0	3.8	

The minimum and maximum of 10 minutes intra operative MAP blood pressure is 58 and 78 in control group. The minimum and maximum of 10 minutes intra operative MAP blood pressure is 60 and 74 in case group. The Mean \pm SD of 10 minutes intra operative MAP blood pressure is 67.6 ± 5.6 in control group. The Mean \pm SD of 10 minutes intra operative MAP blood pressure is 67.1 ± 3.7 in case group.

The minimum and maximum of 15 minutes intra operative MAP blood pressure is 62 and 78 in control group. The minimum and maximum of 15 minutes intra operative MAP blood pressure is 59 and 73 in case group. The Mean \pm SD of 15 minutes intra operative MAP blood pressure is 69.2 ± 5.5 in control group. The Mean \pm SD of 15 minutes intra operative MAP blood pressure is 66.4 ± 3.7 in case group.

The minimum and maximum of 20 minutes intra operative MAP blood pressure is 61 and 78 in control group. The minimum and maximum of 20 minutes intra operative MAP blood pressure is 59 and 72 in case group. The Mean \pm SD of 20 minutes intra operative MAP blood pressure is 69.0 ± 5.6 in control group. The Mean \pm SD of 20 minutes intra operative MAP blood pressure is 66.0 ± 3.8 in case group. There is no significant difference between control and case groups for the parameter intra operative MAP blood pressure in 10 minutes. There is significant difference between control and case groups for the parameter intra operative MAP blood pressure in 15, 20 minutes.

Table 9: The comparison between control and case groups for the parameter intra-operative analgesia requirement

		Intra OP Analgesia Requirement		Total	P-value
		Yes	No		
Groups	Control	6	24	30	0.024
	Case	0	30	30	

The intra operative analgesia requirement 'yes' is 6 (20%) in control group and 0 in case group. The intra operative analgesia requirement 'no' is 24 (80%) in control group and 30 (100%) in case group. There is significant difference between control and case groups for the parameter intra operative analgesia requirement.

Table 10: The comparison between control and case groups for the parameter post-operative heart rate monitoring in 20, 40, 60, 80, 100, 120 minutes

Time points	Groups	N	Minimum	Maximum	Mean	SD	P-Value
20Minutes	Control	30	95	148	116.0	12.1	0.034
	Case	30	96	131	110.0	9.1	
40Minutes	Control	30	98	144	115.6	10.8	0.010
	Case	30	93	130	108.7	9.3	
60Minutes	Control	30	96	146	115.1	11.4	0.009
	Case	30	92	129	107.9	9.2	
80Minutes	Control	30	96	144	115.1	11.0	0.003
	Case	30	91	129	106.7	9.6	
100Minutes	Control	30	96	144	115.5	11.2	0.002
	Case	30	93	127	106.9	9.0	
120Minutes	Control	30	98	142	115.3	10.9	0.001
	Case	30	92	127	106.4	9.3	

The minimum and maximum of 20 minutes Post-Operative heart rate monitoring is 95 and 148 in control group. The minimum and maximum of 20 minutes Post-Operative heart rate monitoring is 96 and 131 in case group. The Mean \pm SD of 20 minutes Post-Operative heart rate monitoring is 116.0 ± 12.1 in control group. The Mean \pm SD of 20 minutes Post-Operative heart rate monitoring is 110.0 ± 9.1 in case group. The minimum and maximum of 40 minutes Post-Operative heart rate monitoring is 98 and 144 in control group.

The minimum and maximum of 40 minutes Post-Operative heart rate monitoring is 93 and 130 in case group. The Mean \pm SD of 40 minutes Post-Operative heart rate monitoring is 115.6 ± 10.8 in control group. The Mean \pm SD of 40 minutes Post-Operative heart rate monitoring is 108.7 ± 9.3 in case group. The minimum and maximum of 60 minutes Post-Operative heart rate monitoring is 96 and 146 in control group. The minimum and maximum of 60 minutes Post-Operative heart rate monitoring is 92 and 129 in case group. The Mean \pm SD of 60 minutes Post-Operative heart rate monitoring is 115.1 ± 11.4 in control group. The Mean \pm SD of 60 minutes Post-Operative heart rate monitoring is 107.9 ± 9.2 in case group.

The minimum and maximum of 80 minutes Post-Operative heart rate monitoring is 96 and 144 in control group. The minimum and maximum of 80 minutes Post-Operative heart rate monitoring is 91 and 129 in case group. The Mean \pm SD of 80 minutes Post-Operative heart rate monitoring is 115.1 ± 11.0 in control group. The Mean \pm SD of 80 minutes Post-Operative heart rate monitoring is 106.7 ± 9.6 in case group. The minimum and maximum of 100 minutes Post-Operative heart rate monitoring is 96 and 144 in control group.

The minimum and maximum of 100 minutes Post-Operative heart rate monitoring is 93 and 127 in case group. The Mean \pm SD of 100 minutes Post-Operative heart rate monitoring is 115.5 ± 11.2 in control group. The Mean \pm SD of 100 minutes Post-Operative heart rate

monitoring is 106.9 ± 9.0 in case group. The minimum and maximum of 120 minutes Post-Operative heart rate monitoring is 98 and 142 in control group. The minimum and maximum of 100 minutes Post-Operative heart rate monitoring is 92 and 127 in case group. The Mean \pm SD of 120 minutes Post-Operative heart rate monitoring is 115.3 ± 10.9 in control group. The Mean \pm SD of 120 minutes Post-Operative heart rate monitoring is 106.4 ± 9.3 in case group. There is significant difference between control and case groups for the parameter Post-Operative heart rate monitoring in 20, 40, 60, 80, 100, 120 minutes.

Table 11: The comparison between control and case groups for the parameter Post-Operative BP MAP Monitoring in 20, 40, 60, 80, 100, 120 minutes

Time points	Groups	N	Minimum	Maximum	Mean	SD	P-Value
20Minutes	Control	30	68	115	79.9	14.3	0.041
	Case	30	63	116	72.2	14.2	
40Minutes	Control	30	63	115	72.7	13.1	0.014
	Case	30	60	74	66.9	3.1	
60Minutes	Control	30	62	98	69.8	7.2	0.034
	Case	30	60	72	66.5	3.2	
80Minutes	Control	30	62	79	68.5	4.4	0.021
	Case	30	59	73	66.2	3.3	
100Minutes	Control	30	62	76	68.0	4.3	0.024
	Case	30	59	73	65.7	3.4	
120Minutes	Control	30	61	74	68.0	3.5	0.023
	Case	30	58	74	65.8	3.6	

The minimum and maximum of 20 minutes Post-Operative BP MAP Monitoring is 68 and 115 in control group. The minimum and maximum of 20 minutes Post-Operative BP MAP Monitoring is 63 and 116 in case group. The Mean \pm SD of 20 minutes Post-Operative BP MAP Monitoring is 79.9 ± 14.3 in control group. The Mean \pm SD of 20 minutes Post-Operative BP MAP Monitoring is 72.2 ± 14.2 in case group. The minimum and maximum of 40 minutes Post-Operative BP MAP Monitoring is 63 and 115 in control group.

The minimum and maximum of 40 minutes Post-Operative BP MAP Monitoring is 60 and 74 in case group. The Mean \pm SD of 40 minutes Post-Operative BP MAP Monitoring is 72.7 ± 13.1 in control group. The Mean \pm SD of 40 minutes Post-Operative BP MAP Monitoring is 66.9 ± 3.1 in case group. The minimum and maximum of 60 minutes Post-Operative BP MAP Monitoring is 62 and 98 in control group.

The minimum and maximum of 60 minutes Post-Operative BP MAP Monitoring is 60 and 72 in case group. The Mean \pm SD of 60 minutes Post-Operative BP MAP Monitoring is 69.8 ± 7.2 in control group. The Mean \pm SD of 60 minutes Post-Operative BP MAP Monitoring is 66.5 ± 3.2 in case group. The minimum and maximum of 80 minutes Post-Operative BP MAP Monitoring is 62 and 79 in control group.

The minimum and maximum of 80 minutes Post-Operative BP MAP Monitoring is 59 and 73 in case group. The Mean \pm SD of 80 minutes Post-Operative BP MAP Monitoring is 68.5 ± 4.4 in control group. The Mean \pm SD of 80 minutes Post-Operative BP MAP Monitoring is 66.2 ± 3.3 in case group. The minimum and maximum of 100 minutes Post-Operative BP MAP Monitoring is 62 and 76 in control group.

The minimum and maximum of 100 minutes Post-Operative BP MAP Monitoring is 59 and 73 in case group. The Mean \pm SD of 100 minutes Post-Operative BP MAP Monitoring is 68.0 ± 4.3 in control group. The Mean \pm SD of 100 minutes Post-Operative BP MAP Monitoring is 65.7 ± 3.4 in case group. The minimum and maximum of 120 minutes Post-Operative BP MAP Monitoring is 61 and 74 in control group.

The minimum and maximum of 100 minutes Post-Operative BP MAP Monitoring is 58 and 74 in case group. The Mean \pm SD of 120 minutes Post-Operative BP MAP Monitoring is 68.0 ± 3.5 in control group. The Mean \pm SD of 120 minutes Post-Operative BP MAP Monitoring is 65.8 ± 3.6 in case group. There is significant difference between control and case groups for the parameter Post-Operative BP MAP Monitoring in 20, 40, 60, 80, 100, 120 minutes.

Table 12: The comparison between control and case groups for the parameter VAS score in 0, 2, 4, 6, 8, 10, 12 hours

Time points	Groups	N	Minimum	Maximum	Median	IQR	P-Value
0 Hours	Control	30	0	6	0	3to0	0.026
	Case	30	0	2	0	0to0	
2 Hours	Control	30	0	6	0	2to0	0.001
	Case	30	0	1	0	0to0	
4 Hours	Control	30	0	8	0	3to0	0.004
	Case	30	0	2	0	0to0	
6 Hours	Control	30	0	7	0	2to0	0.032
	Case	30	0	1	0	0to0	
8 Hours	Control	30	0	6	1.5	2.25to 0	<0.0001
	Case	30	0	4	0	0to0	
10Hours	Control	30	0	5	0	2to0	<0.0001
	Case	30	0	1	0	0to0	
12Hours	Control	30	0	1	0	0to0	0.020
	Case	30	0	2	0	0.5to0	

The minimum and maximum of 0 hours VAS score is 0 and 6 in control group. The minimum and maximum of 0 hours VAS score is 0 and 2 in case group. The Median \pm IQR of 0 hours VAS score is 0 ± 3 to 0 in control group. The Median \pm IQR of 0 hours VAS score is 0 ± 0 to 0 in case group. The minimum and maximum of 2 hours VAS score is 0 and 6 in control group. The minimum and maximum of 2 hours VAS score is 0 and 1 in case group. The Median \pm IQR of 2 hours VAS score is 0 ± 2 to 0 in control group.

The Median \pm IQR of 2 hours VAS score is 0 ± 0 to 0 in case group. The minimum and maximum of 4 hours VAS score is 0 and 8 in control group. The minimum and maximum of 4 hours VAS score is 0 and 2 in case group. The Median \pm IQR of 4 hours VAS score is 0 ± 3 to 0 in control group. The Median \pm IQR of 4 hours VAS score is 0 ± 0 to 0 in case group. The minimum and maximum of 6 hours VAS score is 0 and 7 in control group. The minimum and maximum of 6 hours VAS score is 0 and 1 in case group.

The Median \pm IQR of 6 hours VAS score is 0 ± 2 to 0 in control group. The Median \pm IQR of 6 hours VAS score is 0 ± 0 to 0 in case group. The minimum and maximum of 8 hours VAS score is 0 and 6 in control group. The minimum and maximum of 8 hours VAS score is 0 and 4 in case group. The Median \pm IQR of 8 hours VAS score is 1.5 ± 2.25 to 0 in control group.

The Median \pm IQR of 8 hours VAS score is 0 ± 0 to 0 in case group. The minimum and maximum of 10 hours VAS score is 0 and 5 in control group.

The minimum and maximum of 10 hours VAS score is 0 and 1 in case group. The Median \pm IQR of 10 hours VAS score is 0 ± 2 to 0 in control group. The Median \pm IQR of 10 hours VAS score is 0 ± 0 to 0 in case group. The minimum and maximum of 12 hours VAS score is 0 and 1 in control group. The minimum and maximum of 12 hours VAS score is 0 and 2 in case group. The Median \pm IQR of 12 hours VAS score is 0 ± 0 to 0 in control group. The Median \pm IQR of 12 hours VAS score is 0 ± 0.5 to 0 in case group. There is significant difference between control and case groups for the parameter VAS score in $0, 2, 4, 6, 8, 10, 12$ hours.

Table 13: The comparison between control and case groups for the parameter rescue analgesia in $0, 2, 4, 6, 8, 10, 12$ hours

Time points	Groups	Rescue Analgesia		Total	P-value
		Yes	No		
0 Hours	Control	7	23	30	0.011
	Case	0	30	30	
2 Hours	Control	6	24	30	0.024
	Case	0	30	30	
4 Hours	Control	8	22	30	0.026
	Case	1	29	30	
6 Hours	Control	6	24	30	0.024
	Case	0	30	30	
8 Hours	Control	6	24	30	0.024
	Case	0	30	30	
10 Hours	Control	6	24	30	0.024
	Case	0	30	30	
12 Hours	Control	8	22	30	0.026
	Case	1	29	30	

The rescue analgesia of 0 hours 'yes' is 7 (23.3%) and 'no' is 23 (76.7%) in control group. The rescue analgesia of 0 hours 'yes' is 0 and 'no' is 30 (100%) in case group. The rescue analgesia of 2 hours 'yes' is 6 (20%) and 'no' is 24 (80%) in control group. The rescue analgesia of 2 hours 'yes' is 0 and 'no' is 30 (100%) in case group. The rescue analgesia of 4 hours 'yes' is 8 (26.7%) and 'no' is 22 (73.3%) in control group.

The rescue analgesia of 4 hours 'yes' is 1 (3.3%) and 'no' is 29 (96.7%) in case group. The rescue analgesia of 6 hours 'yes' is 6 (20%) and 'no' is 24 (80%) in control group. The rescue analgesia of 6 hours 'yes' is 0 and 'no' is 30 (100%) in case group. The rescue analgesia of 8 hours 'yes' is 6 (20%) and 'no' is 24 (80%) in control group. The rescue analgesia of 8 hours 'yes' is 0 and 'no' is 30 (100%) in case group.

The rescue analgesia of 10 hours 'yes' is 6 (20%) and 'no' is 24 (80%) in control group. The rescue analgesia of 10 hours 'yes' is 0 and 'no' is 30 (100%) in case group. The rescue analgesia of 12 hours 'yes' is 8 (26.7%) and 'no' is 22 (73.3%) in control group. The rescue analgesia of 12 hours 'yes' is 1 (3.3%) and 'no' is 29 (96.7%) in case group. There is significant difference between control and case groups for the parameter rescue analgesia in

0, 2, 4, 6, 8, 10, 12 hours.

Table 14: The rescue analgesia distribution of all subjects in control group

Time points	No. of subjects	% of subjects
0 Hours	5	16.7%
2 Hours	6	20.0%
4 Hours	5	16.7%
6 Hours	5	16.7%
8 Hours	6	20.0%
10 Hours	2	6.7%
12 Hours	2	6.7%

The rescue analgesia of 0 hours is 5 (16.7%), 2 hours is 6 (20%), 4 hours is 5 (16.7%), 6 hours is 5 (16.7%), 8 hours is 6 (20%), 10 hours is 2 (6.7%) and 12 hours is 2 (6.7%).

Table 15: The rescue analgesia distribution of all subjects in case group

Time points	No. of subjects	%of subjects
0 Hours	0	0.0%
2 Hours	0	0.0%
4 Hours	1	3.3%
6 Hours	0	0.0%
8 Hours	0	0.0%
10Hours	0	0.0%
12Hours	0	0.0%

The rescue analgesia of 0 hours is 0, 2 hours is 0, 4 hours is 1 (3.3%), 6 hours is 0, 8 hours is 0, 10 hours is 0, and 12 hours is 0.

Table 16: The comparison between time points for the parameter VAS score in control group

Time points	N	Minimum	Maximum	Median	IQR	P-Value
0 Hours	30	0	6	0	3to0	0.105
2 Hours	30	0	6	0	2to0	
4 Hours	30	0	8	0	3to0	
6 Hours	30	0	7	0	2to0	
8 Hours	30	0	6	1.5	2.25 to 0	
10Hours	30	0	5	0	2to0	
12 Hours	30	0	5	0	0to0	

The minimum and maximum of 0 hours VAS score is 0 and 6. The Median \pm IQR of 0 hours VAS score is 0 \pm 3 to 0. The minimum and maximum of 2 hours VAS score is 0 and 6. The Median \pm IQR of 2 hours VAS score is 0 \pm 2 to 0. The minimum and maximum of 4 hours VAS score is 0 and 8. The Median \pm IQR of 4 hours VAS score is 0 \pm 3 to 0. The minimum and maximum of 6 hours VAS score is 0 and 7.

The Median \pm IQR of 6 hours VAS score is 0 ± 2 to 0. The minimum and maximum of 8 hours VAS score is 0 and 6. The Median \pm IQR of 8 hours VAS score is 1.5 ± 2.25 to 0. The minimum and maximum of 10 hours VAS score is 0 and 5. The Median \pm IQR of 10 hours VAS score is 0 ± 2 to 0. The minimum and maximum of 12 hours VAS score is 0 and 5. The Median \pm IQR of 12 hours VAS score is 0 ± 0 to 0. There is no significant difference between different time points for the parameter VAS score.

Table 17: The comparison between time points for the parameter VAS score in case group

Time points	N	Minimum	Maximum	Median	IQR	P-Value
0 Hours	30	0	2	0	0to0	0.042
2 Hours	30	0	1	0	0 to0	
4 Hours	30	0	2	0	0to0	
6 Hours	30	0	1	0	0to0	
8 Hours	30	0	4	0	0to0	
10Hours	30	0	1	0	0to0	
12Hours	30	0	2	0	0.5to0	

The minimum and maximum of 0 hours VAS score is 0 and 2. The Median \pm IQR of 0 hours VAS score is 0 ± 0 to 0. The minimum and maximum of 2 hours VAS score is 0 and 1. The Median \pm IQR of 2 hours VAS score is 0 ± 0 to 0. The minimum and maximum of 4 hours VAS score is 0 and 2. The Median \pm IQR of 4 hours VAS score is 0 ± 0 to 0. The minimum and maximum of 6 hours VAS score is 0 and 1. The Median \pm IQR of 6 hours VAS score is 0 ± 0 to 0. The minimum and maximum of 8 hours VAS score is 0 and 4. The Median \pm IQR of 8 hours VAS score is 0 ± 0 to 0. The minimum and maximum of 10 hours VAS score is 0 and 1. The Median \pm IQR of 10 hours VAS score is 0 ± 0 to 0. The minimum and maximum of 12 hours VAS score is 0 and 2. The Median \pm IQR of 12 hours VAS score is 0 ± 0.5 to 0. There is significant difference between different time points for the parameter VAS score.

Table 18: The comparison between different time points for the parameter Post-Operative BP MAP Monitoring in control group

Time points	N	Minimum	Maximum	Mean	SD	P-Value
20Minutes	30	60	76	68.1	3.7	0.019
40Minutes	30	60	73	67.7	3.9	
60Minutes	30	60	73	67.3	3.9	
80Minutes	30	60	74	67.0	4.1	
100Minutes	30	60	74	66.6	4.3	
120Minutes	30	61	74	67.5	3.5	

The minimum and maximum of 20 minutes Post-Operative BP MAP monitoring is 60 and 76. The Mean \pm SD of 20 minutes Post-Operative BP MAP monitoring is 68.1 ± 3.7 . The minimum and maximum of 40 minutes Post-Operative BP MAP monitoring is 60 and 73. The Mean \pm SD of 40 minutes Post-Operative BP MAP monitoring is 67.7 ± 3.9 . The minimum and maximum of 60 minutes Post-Operative BP MAP monitoring is 60 and 73.

The Mean \pm SD of 60 minutes Post-Operative BP MAP monitoring is 67.3 ± 3.9 . The minimum and maximum of 80 minutes Post-Operative BP MAP monitoring is 60 and 74. The Mean \pm SD of 80 minutes Post-Operative BP MAP monitoring is 67.0 ± 4.1 . The minimum and maximum of 100 minutes Post-Operative BP MAP monitoring is 60 and 74. The Mean \pm SD of 100 minutes Post-Operative BP MAP monitoring is 66.6 ± 4.3 . The minimum and maximum of 120 minutes Post-Operative BP MAP monitoring is 61 and 74. The Mean \pm SD of 120 minutes Post-Operative BP MAP monitoring is 67.5 ± 3.5 . There is significant difference between different time points for the parameter Post-Operative BP MAP monitoring.

Table 19: The comparison between different time points for the parameter Post-Operative BP MAP Monitoring in case group

Time points	N	Minimum	Maximum	Mean	SD	P-Value
20Minutes	30	63	116	72.2	14.2	0.0003
40Minutes	30	60	74	66.9	3.1	
60Minutes	30	60	72	66.5	3.2	
80Minutes	30	59	73	66.2	3.3	
100Minutes	30	59	73	65.7	3.4	
120Minutes	30	58	74	65.8	3.6	

The minimum and maximum of 20 minutes Post-Operative BP MAP monitoring is 63 and 116. The Mean \pm SD of 20 minutes Post-Operative BP MAP monitoring is 72.2 ± 14.2 . The minimum and maximum of 40 minutes Post-Operative BP MAP monitoring is 60 and 74. The Mean \pm SD of 40 minutes Post-Operative BP MAP monitoring is 66.9 ± 3.1 .

The minimum and maximum of 60 minutes Post-Operative BP MAP monitoring is 60 and 72. The Mean \pm SD of 60 minutes Post-Operative BP MAP monitoring is 66.5 ± 3.2 . The minimum and maximum of 80 minutes Post-Operative BP MAP monitoring is 59 and 73. The Mean \pm SD of 80 minutes Post-Operative BP MAP monitoring is 66.2 ± 3.3 . The minimum and maximum of 100 minutes Post-Operative BP MAP monitoring is 59 and 73. The Mean \pm SD of 100 minutes Post-Operative BP MAP monitoring is 65.7 ± 3.4 .

The minimum and maximum of 120 minutes Post-Operative BP MAP monitoring is 58 and 74. The Mean \pm SD of 120 minutes Post-Operative BP MAP monitoring is 65.8 ± 3.6 . There is significant difference between different time points for the parameter Post-Operative BP MAP monitoring.

Table 20: The comparison between different time points for the parameter Post-Operative Heart Rate monitoring in control group

Time points	N	Minimum	Maximum	Mean	SD	P-Value
20 Minutes	30	95	148	116.0	12.1	0.711
40Minutes	30	98	144	115.6	10.8	
60Minutes	30	96	146	115.1	11.4	
80Minutes	30	96	144	115.1	11.0	
100Minutes	30	96	144	115.5	11.2	
120Minutes	30	98	142	115.3	10.9	

The minimum and maximum of 20 minutes Post-Operative heart rate monitoring is 95 and 148. The Mean \pm SD of 20 minutes Post-Operative heart rate monitoring is 116.0 ± 12.1 . The minimum and maximum of 40 minutes Post-Operative heart rate monitoring is 98 and 144. The Mean \pm SD of 40 minutes Post-Operative heart rate monitoring is 115.6 ± 10.8 . The minimum and maximum of 60 minutes Post-Operative heart rate monitoring is 96 and 146. The Mean \pm SD of 60 minutes Post-Operative heart rate monitoring is 115.1 ± 11.4 . The minimum and maximum of 80 minutes Post-Operative heart rate monitoring is 96 and 144. The Mean \pm SD of 80 minutes Post-Operative heart rate monitoring is 115.1 ± 11.0 . The minimum and maximum of 100 minutes Post-Operative heart rate monitoring is 96 and 144. The Mean \pm SD of 100 minutes Post-Operative heart rate monitoring is 115.5 ± 11.2 . The minimum and maximum of 120 minutes Post-Operative heart rate monitoring is 98 and 142. The Mean \pm SD of 120 minutes Post-Operative heart rate monitoring is 115.3 ± 10.9 . There is no significant difference between different time points for the parameter Post-Operative heart rate monitoring.

Table 21: The comparison between different time points for the parameter post-operative heart rate monitoring in case group

Time points	N	Minimum	Maximum	Mean	SD	P-Value
20Minutes	30	96	131	110.0	9.1	<0.0001
40 Minutes	30	93	130	108.7	9.3	
60Minutes	30	92	129	107.9	9.2	
80Minutes	30	91	129	106.7	9.6	
100Minutes	30	93	127	106.9	9.0	
120Minutes	30	92	127	106.4	9.3	

The minimum and maximum of 20 minutes Post-Operative heart rate monitoring is 96 and 131. The Mean \pm SD of 20 minutes Post-Operative heart rate monitoring is 110.0 ± 9.1 . The minimum and maximum of 40 minutes Post-Operative heart rate monitoring is 93 and 130. The Mean \pm SD of 40 minutes Post-Operative heart rate monitoring is 108.7 ± 9.3 . The minimum and maximum of 60 minutes Post-Operative heart rate monitoring is 92 and 129. The Mean \pm SD of 60 minutes Post-Operative heart rate monitoring is 107.9 ± 9.2 . The minimum and maximum of 80 minutes Post-Operative heart rate monitoring is 91 and 129. The Mean \pm SD of 80 minutes Post-Operative heart rate monitoring is 106.7 ± 9.6 . The minimum and maximum of 100 minutes Post-Operative heart rate monitoring is 93 and 127. The Mean \pm SD of 100 minutes Post-Operative heart rate monitoring is 106.9 ± 9.0 . The minimum and maximum of 120 minutes Post-Operative heart rate monitoring is 92 and 127. The Mean \pm SD of 120 minutes Post-Operative heart rate monitoring is 106.4 ± 9.3 . There is significant difference between different time points for the parameter Post-Operative heart rate monitoring.

Discussion

There are several reasons why ultrasonography may be of value in paediatric regional anaesthesia. Most nerves are relatively superficial, particularly in small children, and therefore high-resolution imaging is possible even with portable ultrasound equipment. Direct

visualization of the nerve or neuraxial structures, vessels, tendons and bones allows optimal placement of the local anaesthetic and thereby reduces the risk of intraneuronal, intravascular or, more pertinent in this study, intraperitoneal injection.

With the advancement in surgical technique and anaesthesia, we must institute a multimodal approach of analgesia rather than just rely on one modality. II/IH block is a regional anaesthetic technique that blocks neural afferents of the lower anterolateral abdominal wall.

In this study, the precise administration of lower volumes of local anaesthetic under ultrasound guidance resulted in effective ilioinguinal /iliohypogastric nerve blocks in children, with a reduced failure rate and no complications.

We observed that the pain scores were considerably lower in the II/IH block group when compared with the local wound infiltration group. Although the difference in the pain scores was small, it was statistically and clinically significant, considering the number of patients receiving rescue analgesia. The postoperative requirement of analgesics was also considerably lower in the II/IH block group.

II/IH nerve block and i.v. morphine administered following general anesthesia for unilateral orchidopexy in day surgery unit are safe and effective in controlling postoperative pain, but opioid analgesia had a higher incidence of postoperative vomiting and itching⁵II/IH nerve block has an opioid-sparing analgesic efficiency as proven by better pain relief scores in the block group.

Pain score

Visual analogue scale was used to assess the degree of pain in our study. The visual analogue scale has been used nowadays widely as a sensitive and valid measure of pain intensity. In our study since regional anaesthesia was used all the patients were fully awake and cooperative in the immediate post-operative period and were able to complete the visual analogue scale during the study period. It was found that the pain score was significantly higher in the control group and the pain score was significantly lower and the amount of rescue analgesia was given in the earlier hours when compared to the case group.

Complications of Ilioinguinal and Hypogastric nerve block there have been 2 case reports of weakness in the lower limb following this nerve block in previous studies. In our study, none of the 30 patients who received ilioinguinal and iliohypogastric nerve block had the above complication^[2, 3].

a reduction in local anaesthetic volume potentially reduces unwanted side effects. Transient femoral nerve palsy is a well-described side effect of ilioinguinal nerve block in children. A femoral nerve block may delay ambulation and can be disturbing to the child and parents^[4].

In our study, it was observed that

- a. Group A and Group B are comparable in terms of Age, ASA category, and Anthropometric measurements using statistical analysis with p values are more than 0.005
- b. Group B participants have a significant lower vas score when compared to group A.
- c. Group B participants having a prolonged mean time interval for the first dose of rescue analgesia in our study.
- d. Group B participants had reduced total analgesic consumption over the first twelve hours of the postoperative period.
- e. Group B had no significant variations in haemodynamics and did not require any fentanyl supplementation.

Conclusion

In our study Group B participants had ultrasound guided ilioinguinal and iliohypogastric nerve block with 0.3ml/kg of 0.25% bupivacaine and group A participants had landmark technique of ilioinguinal and iliohypogastric nerve block with 0.3kl/kg.

In our study we found that Group B participants had

1. Lower Visual analog score.
2. Prolonged duration of postoperative analgesia.
3. Reduced consumption of analgesics over the first twelve hours of postoperative period.

Based on our findings in our study we found that Ultrasound guided ilioinguinal and iliohypogastric nerve block using long acting local anaesthetic is a novel and very effective method for postoperative pain relief in inguinal hernia patients.

Acknowledgment

The author is thankful to Department of Anesthesiology for providing all the facilities to carry out this work.

Conflict of Interest: None.

Funding Support: Nil.

References

1. The Psychological Disturbances Of The Child Undergoing Surgery-From Admission Till Beyond Discharge Marie T. Aouad*
2. Rosaria BJ, Skinner PP, Raftery AT. Transient femoral palsy complicating Pre-operative ilioinguinal nerve blockade for inguinal herniorrhaphy. Br. J of Surg. 1994;81:897.
3. Johnson CM. Transient femoral nerve palsy after ilioinguinal block. Comment. Anesth Intens care. 1996;24:402.
4. Willschke HMD, Bösenberg A MBChB, FFA(SA), Marhofer P MD, Johnston S MBChB, FCA(SA) Kettner SMD, *et al.* Ultrasonographic-Guided Ilioinguinal/Ilioypogastric Nerve Block in Pediatric Anesthesia: What is the Optimal Volume?, Anesthesia & Analgesia. 2006 Jun 102(6):1680-1684.
5. Al-Zaben KR, Qudaisat IY, Abu-Halaweh SA, Zuabi WS, Al-Momani HM, Albsoul NM, *et al.* Comparison of ilioinguinal/ilioypogastric nerve blocks and intravenous morphine for control of post-orchidopexy pain in pediatric ambulatory surgery. Middle East J Anaesthesiol. 2014;22:393.