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Original Research Article

Spermatic cord block in open inguinal hernioplasty

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ABSTRACT

Background: Spermatic cord block is a useful technique for providing anesthesia with scrotal pain and it has been described and published in the urology and anesthesia literature for more than 40 years. Spermatic cord block for inguinal hernioplasty along with spinal anaesthesia avoids the potential risks of neuraxial and general anesthesia and provides long-lasting postoperative analgesia. The aim of this study is to evaluate the postoperative effect of 0.5% Bupivacaine for spermatic cord block along with spinal anaesthesia in inguinal hernioplasty.
Methods: This study was carried out in KPC medical college and hospital on 100 patients with ASA physical status I and II, age older than or equal to 18 years undergoing elective open inguinal hernioplasty from September 2021 to August 2022. Patients were randomly allocated into two equal groups: 50 patients received spermatic cord block after mesh placement by bupivacaine 5 ml (0.5%), and 1 ml normal saline (group 1), and 50 patients received 6 ml saline injection in spermatic cord.
Results: There was no significant difference between the demographic data, patient characteristics, heart rate, mean arterial blood pressure, and oxygen saturation in the studied groups. There was significantly rapid onset and prolonged duration of blockade, significant decrease in visual analog scale score at 6 h and 12 h postoperatively and the amount of rescue analgesia in group 1 respectively.
Conclusions: Spermatic cord block in inguinal hernioplasty surgery improves onset of the block, prolongs postoperative analgesia and reduces the consumption of of postoperative rescue analgesics.

Keywords: Bupivacaine, Inguinal hernioplasty, Spermatic cord block

INTRODUCTION

Inguinal hernia repair belong to the group of the most commonly performed procedures in general surgery, which can be done under general anaesthesia, spinal or epidural anaesthesia and local anaesthesia depending upon a variety of factors such as surgeon's wish, patient's condition, safety, feasibility and cost, etc.[1-3]

Spermatic cord block is a useful technique for providing anesthesia to males in scrotal surgeries which has been described and published in the urology and anesthesia literature[4] for more than 40 years.

This technique carries the advantage of avoiding the risks of neuraxial and general anesthesia and offers long period of postoperative analgesia.[5] Many inguinoscrotal procedures like simple inguinal hernia repair, inguinal lymph node biopsy, hydrocelectomy, testicular biopsy, testicular fixation, orchidectomy, and scrotal exploration can be done under local anesthesia.[6]

This study is to evaluate the postoperative effect of 0.5% Bupivacaine for spermatic cord block along with spinal anaesthesia for patients undergoing inguinal hernioplasty.

METHODS

Study design

Study design was institution based, observational and randomised control study.

Study area

Study carried out KPC medical college and hospital

Study population

Patients undergoing open inguinal hernioplasty were included.

Inclusion criteria

All patients undergoing open elective inguinal hernioplasty at KPCMCH between 18-70 years age group with ASA physical status I and II.

Study period

Study was carried out from 12 months (From September 2021 to August 2022).

Sample size

The 100 patients were included in the study.

Exclusion criteria

Patients below 18 years, patients above 70 years, patient not giving consent for study, morbidly obese with a BMI over 40, blood coagulation abnormalities such as international normalized ratio of more than 1.5 or platelet count under 10×10^3, allergy to the given drug, local infection at the site of injection and patients declared unfit by anaesthesiologist due to comorbidities were excluded from the study.

Case and control group

The 100 patients following inclusion criteria were randomised into 2 groups based on simple randomisation sampling with the help of random number table so that each and every study subject get equal chance of being selected either in case or control group-Group 1 (Case group)=50 patients received spermatic cord block after mesh placement by bupivacaine 5 ml (0.5%), and 1ml normal saline and group 2 (Control group)=50 patients received 50 patients received 6ml saline injection in spermatic cord.

Routine laboratory investigations were performed, including complete blood count, prothrombin time and activity, and liver (serum glutamate pyruvate transaminase, serum glutamic-oxaloacetic transaminase, total bilirubin, and serum albumin) and renal function (urea and creatinine) tests. Intravenous access was obtained using peripheral 18-G cannula. Routine monitoring of heart rate (HR) by ECG, mean arterial blood pressure (MAP) using non-invasive blood pressure, and peripheral oxygen saturation (SPO_2) using pulse oximeter had been performed. Administration of 2.8 ml of 0.5% Bupivacaine for spinal anaesthesia was given to all patients before surgery.

A total of 50 patients received spermatic cord block by plain bupivacaine 5 ml (0.5%) and 1-ml normal saline (group 1), and 50 patients received spermatic cord injection with 6 ml normal saline (group 2) after mesh placement.

Demographic data including age, weight, duration of surgery and type of surgery, MAP, HR, and SpO_2 were recorded. Onset of spermatic cord block was recorded.

Postoperative pain was assessed using visual analog scale (VAS; 0=no pain and 10=worst possible pain). Duration of the block and number of patients who needed postoperative rescue analgesia were also recorded.

Ethical consideration

Ethical committee approval was taken from the concerned authorities.

For statistical analysis data were entered into a Microsoft excel spreadsheet and then analyzed by SPSS (version 27.0; SPSS Inc., Chicago, IL, USA) and GraphPad Prism version 5.

RESULTS

A total of 100 patients were randomly allocated into two equal groups: group 1 received spermatic cord by a mixture of Bupivacaine and 1-ml normal saline, and group 2 received spermatic cord injection of 6 ml normal saline. Patients with failed technique (dropped out) owing to technical problems (4 in group 1 and 2 in group 2) did not complete the study. Therefore, 46 patients in group 1 and 48 patients in group 2 were included.

There was no significant difference between the demographic data including age and weight (Table 1).

There was no significant difference in HR mean value between both groups throughout perioperative period. There was no significant difference in MAP between both groups throughout peri-operative period (Tables 2 and 3).

The VAS mean value in group 2 was 1.17±1.27, 2.09±1.59, 4.87±2.01, 0.91±1.41, 1.52±1.73, and 1.78±1.59 at time 0, 2, 6, 12, 18, and 24 h, respectively. There was significant increase in VAS at 6 h post-operatively compared with preoperative mean value (P=0.001). In group 1, VAS mean value was 0.79±0.72, 1.46±1.28,1.58±1.21, 4.50±2.17, 1.29±1.60 and 1.50±1.25 at preoperative, 2, 6, 12, 18, and 24 h, respectively.

There was significant increase in VAS at 12 h compared with preoperative mean value (p=0.001) (Table 4).

Table 1: Patients characteristics in the studied groups.

Variables	Range	Mean±SD	T test	P value
Age (Years)				
Group 1	22-62		0.478	0.634
Group 2	22-55			
Weight (kg)				
Group 1	60-99	76.4±11.19	1.160	0.252
Group 2	65-100	79.84±9.72		
Duration (min)				
Group 1	65-120	94.8±12.69	0.854	0.841
Group 2	60-119	95.83±13.62		

Table 2: Comparison of heart rate changes in the studied groups (beats/min).

HR	Range	Mean±SD	T test	P value
HR (Baseline)				
Group 1	67-90	80.44±6.91	1.365	0.248
Group 2	65-91	78.04±7.60		
HR (5 min)				
Group 1	67-93	81.40±7.30	0.192	0.663
Group 2	70-90	80.52±6.90		
HR (30 min)				
Group 1	70-89	80.39±5.71	2.028	0.161
Group 2	67-89	77.79±6.74		
HR (60 min)				
Group 1	67-90	81.26±6.70	3.451	0.07
Group 2	65-90	77.50±7.16		
HR (90 min)				
Group 1	65-90	80.96±6.71	1.984	0.166
Group 2	65-90	78.08±7.25		
HR (120 min)				
Group 1	67-92	81.61±6.31	3.888	0.055
Group 2	67-91	77.63±7.46		

Table 3: Comparison of mean arterial blood pressure changes in the studied groups (mmHg).

MAP	Range	Mean±SD	T test	P value
MAP (baseline)				
Group 1	79-101	88.88±5.87	0.698	0.408
Group 2	73-110	90.56±8.17		
MAP (5 min)				
Group 1	67-103	86.96±6.97	0.080	0.779
Group 2	67-106	86.28±9.80		
MAP (30 min)				
Group 1	75-96	86.57±5.03	0.076	0.785
Group 2	74-99	87.08±7.58		
MAP (60 min)				
Group 1	78-97	86.96±5.22	0.054	0.817
Group 2	76-98	87.33±5.86		
MAP (90 min)				
Group 1	79-97	87.04±4.74	0.194	0.662
Group 2	75-104	87.83±7.23		
MAP (120 min)				
Group 1	66-95	86.09±5.87	1.230	0.273
Group 2	72-106	88.17±6.92		

Table 4: Visual analog scale in the studied groups.

VAS	Range	Mean±SD	T test	P value
VAS (T0)				
Group 1	0-2	0.79±0.72	1.634	0.208
Group 2	0-4	1.17±0.72		
VAS (2h)				
Group 1	0-4	1.46±1.28	2.227	0.143
Group 2	0-6	2.09±1.59		
VAS (6h)				
Group 1	0-6	1.58±1.21	46.614	0.001
Group 2	0-7	4.87±2.01		
VAS (12 h)				
Group 1	0-7	4.50±2.17	44.788	0.001
Group 2	0-5	0.91±1.41		
VAS (18 h)				
Group 1	0-6	1.29±1.60	0.224	0.638
Group 2	0-5	1.52±1.73		
VAS (24 h)				
Group 1	0-4	1.50±1.25	0.459	0.201
Group 2	0-5	1.78±1.59		

Table 5: Need for rescue analgesia in studied groups.

Variables	Group 1, (n=48)	Group 2, (n=46)	T test	P value
Amount of rescue analgesia (Mean±SD) (mg)	2.38±1.53	3.91±1.41	12.829	0.001
Patients who received rescue analgesics, n (%)	12 (25)	46 (100)	6.591	0.001

There was significant increase in group 2 regarding the amount of rescue analgesia of diclofenac needed (p=0.001). Total diclofenac consumption in group 2 was 90 mg, with a mean value of 3.91±1.41 mg, whereas in group 1, it was 57mg, with a mean value of 2.38±1.53 mg. A significantly higher number of patients in group 2 required rescue analgesia, with 46 (100%) patients, compared with only 12 (25%) patients in group 1 (p=0.001) (Table 5).

Table 6: Mean time taken for ambulation.

Mean time (hours)	Group 1, (n=48)	Group 2, (n=46)	P value
	6.4	12.8	0.001

The recovery from anesthesia, in terms of ambulation after surgery, was significantly faster for the patients in the 1st group than those in the 2nd group. Recovery from anesthesia was significantly faster (p<0.05) for patients in the 1st group than those in the 2nd group (Table 6).

DISCUSSION

Patients receiving spermatic cord block using Bupivacaine showed a significant relief of postoperative pain as indicated by the lower values of VAS and the significantly lower need for postoperative rescue analgesia.

We claim that our results are because of the local effects of Bupivacaine. Bupivacaine is an anilide compound which inhibits NMDA receptor mediated synaptic transmission in the dorsal horn of the spinal cord.[7]

In the present study, post-operative pain was recorded at 12, 24 and 48 hours after operation by using VAS and was slightly lower in study group. These results were comparable to other studies conducted by Song et al which showed that VAS scores were lower in patients operated under local anesthesia compared to patients operated under spinal anesthesia.[8]

In this study, the recovery from anesthesia, in terms of ambulation after surgery, was significantly faster for the patients in the 1st group than those in the 2nd group. While Van Veen et al found no significant differences between the two groups with respect to the post-operative ambulation.[9]

In this study, amount of rescue analgesia requirement was much less in study group than control group which was comparable with the studies conducted by Keith et al.[10]

Limitations

The sample size was small. Only 100 cases are not sufficient for this kind of study. The study has been done in a single centre. The study was carried out in a tertiary care hospital, so hospital bias cannot be ruled out. Ongoing COVID 19 pandemic and lockdown has further hampered the study.

CONCLUSION

According to this study spermatic cord block is a simple, safe and effective technique to prevent post operative analgesia which can be easily learned and should be more widely used in inguinal hernioplasty.

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