ORIGINAL ARTICLE

COMPARISON OF EFFICACY OF SPINAL ANAESTHESIA AND SUB-FASCIAL LOCAL ANAESTHETIC INGUINAL FIELD BLOCK FOR OPEN INGUINAL HERNIA REPAIR-A SINGLE INSTITUTIONAL EXPERIENCE

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Background: The use of local anaesthetic for open inguinal hernia surgery has long been restricted to specialist centres. This study aimed to compare the efficacy of spinal anaesthesia and sub-fascial local anaesthetic (LA) for performing open hernia repair and at the same time provide better post op pain relief and early mobilization. **Methods**: In this randomized clinical trial, 62 male patients aged 16–72 were randomly allocated to two groups. Group A received mixture of 20ml 0.5% bupivacain,20ml 2% lignocaine with adrenaline, 20ml normal saline (N/S), 3 ml NaHCO3 sub-fascially for Local anaesthetic (LA) inguinal field block, while Group B received Spinal Anaesthesia (SA) with 0.5%Bupivacaine. Comparison was made in terms of Visual Analogue Score (VAS) recorded intra-operatively at 0 and 30 minutes and post operatively at 2, 4 and 12 hours at rest and on movement. Need for rescue analgesia and total analgesic consumption in both groups were calculated. Interval to pain free ambulation as well as procedural and anaesthesia related complications were compared. **Results**: Mean VAS in the intraoperative period were significantly high in Group A (*p*-value 0.011) at the start of operation and at 30 minutes (*p*-value <0.001). However, it did not correlate with patient satisfaction as 90% of patients in Group A successfully underwent the procedure without need for supplemental analgesia. VAS scores at rest and on movement/cough were comparable in the post op period at 2, 4 and 12 hours in both groups. Interval to pain free ambulation was significantly low in Group A (*p*-value 0.0012). **Conclusion**: Sub facial LA inguinal field block provides effective anaesthesia with optimum post op analgesia, prompt recovery and fewer systemic side effects compared to SA and can safely be used for routine open inguinal hernia surgery.

Keywords: Spinal Anaesthesia, Sub-Fascial local anaesthetic inguinal field block, open inguinal hernia repair, efficacy

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INTRODUCTION

Open hernia repair is one of the commonest procedures performed by general surgeons all over the world. In the UK, there is a preference for using general anaesthesia GA for open hernia surgery.[1] Spinal anaesthesia SA remains the mainstay anaesthesia for inguinal hernia surgery in our setup. SA, although quite effective, is associated with a significant risk of post op hypotension as it reduces peripheral vascular resistance.[2,3] Also, delayed mobilization due to prolonged motor paralysis is a major drawback, along with the risk of delayed voiding ,urinary retention and Post Dural puncture headache. Use of pre-incision infiltration of local anaesthetic Ilioinguinal Iliohypogastric field block has been found to be an effective adjunct as well as an alternative to spinal and general anaesthesia in many studies. Combined with sedation or on its own, it offers less cardiovascular instability, early ambulation and effective post op pain control. Also, it has been found to reduce hospital costs by 50% and gives better patient satisfaction.[4] Local anaesthetic agents have been used in different combinations and concentrations in various studies with good results. The aim of our study was to evaluate the efficacy of a combination of short and long acting local anaesthetic for regional block[5,6] to see if it could be used routinely for inguinal hernia repair instead of SA, thereby avoiding its systemic effects as well as ensuring early mobility.

MATERIAL AND METHODS

This was a randomized control trial conducted from July to December 2014. All the patients, undergoing unilateral inguinal hernia repair, having ASA (American Society of Anaesthesiologists) score I or II and willing to take part were included in the study. The sampling technique was non probability consecutive sampling. Randomization was achieved through lottery method. Group A had 31 patients who received a mixture of 20ml 0.5% bupivacain, 20ml 2% lignocaine with adrenaline, 20ml N/S, 3ml NaHCO3 subfascially, at 2cm above and medial to ACIS for the ilioinguinal and iliohypogastric nerve block, at the wound site and in the midline below umbilicus. NaHCO3 was added to the LA to buffer the mixture in order to improve its effect as well as to reduce pain of administration of LA.[6,7] The

combination of local anaesthetic was given 5 minutes before the incision was made. Group B included 31 patients who received conventional spinal anaesthesia with 15 mg 0.5% bupivacaine administered in subarachnoid space. Both the groups were assessed post op for pain scores with the help of visual analogue scale (VSA) at 0, 30min, 2 hours, 4 hours, and 12 hours after surgery at rest and on movement or coughing. Any episodes of nausea or vomiting were recorded. Early untoward events as wound haematoma, Scrotal swelling, hypotension, persistent headache and urinary retention were noted. The time of request for the first analgesic dose was recorded for both the groups along with need for supplementing further with opioid analgesics during hospital stay. Time to pain free ambulation was noted for both groups. All information was recorded in Data sheet filled on the day of surgery. Statistical analysis was performed with Open Epi, Version 3 open source calculator. All patients underwent Lichtenstein tension free mesh repair. All patients were premeditated with Paracetamol 1g, Ibuprofen 400mg and Ranitidine 150 mg approximately 1 hr before surgery. To allow for accurate measurement of VAS sedation was not administered. Dexamethasone 8 mg IV and Ondansetron 4 mg IV was used for prophylaxis of post op nausea and vomiting .It was decided to give fentanyl 50–100 mcg to pts in case of poor effect of LA and patients complaining of pain during the procedure.GA was to be given in case of block failure. In the post op period, mild to moderate pain was treated with Diclofenac 75 mg given orally, and refractory pain was treated with oral tramadol 100 mg.

Patients were instructed regarding use of VAS on enrolment in outpatient clinic and on the day of surgery. Per op and post op pain was assessed by a nurse using a Visual analogue scale (VAS 10 mm=no pain, VAS 100 mm worst pain imaginable) at rest and during mobilization or coughing.

Patients with drug or alcohol abuse history, chronic pain, daily use of analgesics, renal disease, cardiovascular disease, hepatic failure, hypersensitivity to LA, NSAIDS ,bleeding disorder or those unable to cooperate. The patients were discharged on the next morning.

RESULTS

All 62 patients were males, with age distribution from 16 to 72 (mean 51.4). All patients were categorised a ASA I/II. Visual Analogue scale (VAS) at 0, 30, 2, 4 and 12 hours was calculated in both groups at rest and on movement/ cough. VAS was interestingly found significantly low (22.4 vs12.8) at the start of surgery and 30 min into surgery (15.6 vs 10.4) in group B.

However, in terms of patient satisfaction with the progress of surgery, 28 of 31 (90.3%) patients in group A were satisfied with the progress of surgery and categorised the procedure as very good. 2 (8)% patients received 100 mg fentanyl for high VAS scores .No patient needed conversion to SA or GA. In the post op period, the difference in VAS scores of the two groups measured at 2, 4 and 12 hours at rest and on coughing/movement were not statistically significant as shown in graph-1.

Hours to pain free independent ambulation were 1.8 (±0.25) in A and 3.5(±0.5) in B, p-value 0.0012. In group B, 3 patients went into urinary retention. One patient in LA group developed transient femoral nerve palsy, which resolved overnight. 4 (9.7%) patients in Group B developed transient hypotension which responded to IV fluid supplementation. Total analgesic requirement for LA was slightly more (3.2 vs 2.8). However, it wasn't statistically significant. There were two cases of scrotal swelling and 1of wound haematoma in Group A. The results are documented in table 1 & 2.

Table-1: Demographic features and VAS among the two groups

	Group A LA	Group B SA	*p*-value
Age	48.85±15.5	50.87±11.7	0.13
Gender	M 100%	M100%	
ASA I/II	19/12	22/9	
VAS0	21.26±11.9	10.26±7.4	0.011
VAS30	15.48±5.05	10.32±1.8	<0.001
VAS at 2 hours			
R	24.19±7.	26.1±9.55	0.09
M	32.26±11.75	37.74±9.9	0.42
VAS at 4 hours			
R	32.58±7.5	37.1±7.39	0.9
M	46.45±4.18	42.9±8.4	0.29
VAS at 12 hours			
R	38.39±7.35	47.77±7.91	0.77
M	48.71±7.63	54.19±7.2	0.8
Rescue Analgesia(hours)	4.5	3.9	
Total Analgesic Consumption	3.2±0.2	2.8±0.2	0.9
Duration of Surgery in min	56.7±13.5	59.16±10.23	0.13
Interval to Pain free ambulation	1.8±0.25	3.6±.5	<0.001

VAS: Visual Analogue Score; R Rest; M Movement/Cough; G A: LA Field block, G,B: SA

Table-2: Post-operative complications among two groups

	Group-A	Group-B	*p*-value
PONV	2 (8%)	5 (20%).	0.43
Hypotension	0	4 (12.9%)	
Arrhythmias	0	0	
Urinary retention	0	3 (9.7%)	
Headache	0	3 (9.7%)	
Haematoma	1 (3%)	0	
Scrotal swelling	2 (6%)	0	

PONV: post-operative nausea vomiting

DISCUSSION

Approximately 20 million groin hernioplasties are performed each year worldwide, over 17000 operations in Sweden, over 12000 in Finland, over 80000 in England and over 800000 in the US.[8] Due to its ubiquity many studies have been conducted to improve the outcome of hernia surgery and therefore the procedure has evolved immensely. Laparoscopic hernia repair is fast gaining popularity and is especially indicated for bilateral and recurrent hernias. However, unlike laparoscopic Cholecystectomy, it hasn't yet become the gold standard due to complexity of the procedure technique.[7] Open repair, therefore, remains most common hernia repair.

Irving Lichtenstein revolutionized the inguinal hernia repair with the use of a mesh. The Royal colleges of surgery UK and British Hernia Society advocate the use of Lichtenstein technique for all open hernia repairs.[9] While consensus exists on Lichtenstein repair as the technique of choice in most centres, there is little agreement on the choice of anaesthesia. In the UK, data collected from national and regional databases shows that general anaesthesia (GA) is used in 60–70% of cases, central neuraxis blockade in 10–20%, whereas LA is used in only 5–15%.[10] A level of inertia exists in the adoption of LA despite numerous merits including rapid recovery, reduced cost and proven feasibility in most patients.[11,12] It is especially true for elderly patients.[13–15] Those above 60 have the highest incidence of inguinal hernia yet very often their complex medical conditions render them unsuitable for SA and GA. In our study, 10 out of 31 (32%) patients in Group A were above 60 and all of them underwent the procedure successfully. We excluded ASA III/IV patients from our study population. P. Sanjay *et al* performed successful inguinal hernia repair in LA block in patients with ASA III/IV as well and found complication rates similar to those with ASA I/II.[14] It can be said that the elderly could benefit most from use of effective LA block for inguinal hernia repair.

Theoretically, pre-incisional field block with LA reduces the buildup of nociceptor molecules and thus provides effective pain relief which lasts well into the post op period.[15] The post op analgesic profile of LA field block and SA was found comparably effective in our study. This is contrary to a similar study conducted by K Niaz *et al*[16], where a significantly better post op analgesia obtained by local anaesthetic compared to SA (significant post op pain reported in 8%vs 4% in SA and LA group respectively). Their results are similar to those of Pradeep Goal *et al*[17] who also found a significantly reduced total analgesic consumption in LA vs SA group in their study (2±1.22 vs 3.48±1.53). In terms of undesirable effects from use of LA or SA, Niaz et al[16] reported Scrotal haematoma rate of 10 % in SA group vs 18% in LA (6% vs 0 in our study), while wound haematoma was found in 2% vs 8% respectively (0% vs 3 in our study). Spinal headache which occurs due to Dural puncture in SA, was reported in 4% of their patients whereas in 9.7% of ours. Micturition difficulties are associated with the use of SA due to inhibition of sacral autonomic plexus innervating the urinary bladder. Urinary retention (16% vs 9.7%) in both studies was, therefore, only recorded in patients who received SA. Most studies have reported a superiority of inguinal block in post op period but didn't comment on the anaesthetic efficacy in the intraoperative period as patients were given GA or sedation. We omitted sedation in our patients to ensure accurate recording of VAS intra-operatively and found it quite effective.

Short interval to pain free ambulation is the foremost merit of LA block. A. Demarco found that with anatomical inguinal block, the time to pain free ambulation was 160 (70–300). The mean duration of pain free ambulation in our study was 1.8 (108 min) which is considerably shorter than 160 min. This may be attributed to the lack of use of GA or sedation in our patients. He established that this interval could be further reduced to 75 (30–180) min with the use of ultrasound. Transient Femoral nerve palsy was witnessed in one of our patients in Group A. It is a known side effect of Inguinal field and TAP blocks, and previously reported in literature. It results from incorrect administration of LA between transversus abdominis muscle and fascia. C Aveline found that an improvement in the efficacy of LA Inguinal field block maybe achieved with the help of ultrasound guidance[18,19] with the added benefit of reduced LA amount to be administered. However, due to unavailability, we were unable to administer LA under ultrasound guidance. There is an increasing trend of performing hernia repair, both open and laparoscopic, as day case surgery.[20–22] Specialist centres like British Hernia centre; Lichtenstein Hernia Institute and Shouldice Centre are performing 97–100% of ambulatory hernia surgery in local anaesthesia. Similar success rates have been reproduced at a few non specialist centres as well.[23] The recommendation of BADS (British Association for Day Surgery) 2012 argue that 95% of primary hernias can be operated as day cases.[24] As LA field block does not cause motor paralysis, prompt mobility and adequate Postop

analgesia promises high yield of ambulatory inguinal hernia surgery. R. Dhumale *et al* successfully performed over a 1000 ambulatory hernias in LA field block in a primary care setting with 90% satisfied patients with low recurrence(0.3%). We were able to achieve good results with LA field block in 92% patients. However, due to loss of follow up of a large proportion of patients, we could not assess the efficacy of the two anaesthetic techniques in the intermediate or long term period after discharge. Sub fascial LA field block is clearly safe and efficacious for open unilateral inguinal hernia repair. Large scale studies on its use should be conducted further to help shift the paradigm of hernia surgery in our setup to match it with the rest of the world.

CONCLUSION

Our experience suggests that pre-operative sub fascial infiltration of LA provides effective anaesthesia for performing open inguinal hernia surgery. The post-operative pain control with inguinal field block is as good as, if not better than the SA. With the additional merit of early ambulation, LA can safely be used in routine for open inguinal hernia surgery.

Conflict of interest: No conflict of interest is declared by the authors.

AUTHORS CONTRIBUTION

NS: Article writing, literature review, statistical analysis was done by first author. HUR: *Pro forma* design and data collection. IR, MS. Supervision of study.

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