

Comparison of minimally invasive procedure with the standard open approach for lumbar sympathectomy

Nadeem Ahmad^{1*}, Gyan Prakash Rastogi², Shabina Naznin Haqiqullah³

¹Assistant Professor, Department of General Surgery, Integral Institute of Medical Sciences Research (IIMS&R), Lucknow, Uttar Pradesh, India

²Assistant Professor, Department of General Surgery, Integral Institute of Medical Sciences Research(IIMS&R), Lucknow, Uttar Pradesh, India

³Senior Resident, Department of Pathology, Rajiv Gandhi Medical College & Chhatrapati Shivaji Maharaj Hospital, Kalwa, Thane, Mumbai, Maharashtra, India

Received: 03-11-2021 / Revised: 19-12-2021 / Accepted: 15-01-2022

Abstract

Aim: To compare minimally invasive procedure with the standard open approach for lumbar sympathectomy and to assess the morbidity and evaluate the outcome in terms of operative time, blood loss, complications and recovery time. **Method:** The present study was carried out as a prospective cross-sectional observational study. A total of 60 patients were enrolled in the study who were divided into two groups A and B of 30 each who were operated by open method and laparoscopic method respectively. Patients between age 17 to 80 years with ischemic rest pain that requires continuous analgesia for > 2 weeks, ischemic foot ulcers that failed to heal for > 6 weeks and distal gangrene which is limited to the fore foot were included in the study. **Result:** In group A total 18 out of 30 patients (60%) and in group B total 21 out of 30 patients (70%) were taking analgesics for pain from more than 4 weeks. In group A operative time in 6 patients was ½-1 hr, in 20 patients 1-1½ hrs and in 4 patients operative time was more than 1½ hrs while in group B in 22 patients operative time was ½-1 hr, in 6 patients 1-1½ hr and in 2 patients it was more than 1½ hrs. P value was 0.0002 which was significant. In group A there were ureteric injury in 2 patients, venacaval injury in 1 patient, peritoneal perforation in 1 patient, wound haematoma in 7 patients, wound infection in 6 patients and incisional hernia in 2 patients as intra operative and post operative complications while in group B there was ureteric injury in 1 patient, peritoneal perforation in 1 patient, wound haematoma in 1 patient, wound infection in 2 patient and there was no vena caval injury and incisional hernia as intra operative and post operative complications. P value was 0.02 which was significant. In group A 4 patients recovered in 5-7 days and 26 patient took more than 7 days to recover while in group B 5 patients recovered in 3-5 days, 20 patients recovered in 5-7 days and 5 patients took more than 7 days to recover. P value was 0.006 which was significant. **Conclusion:** In minimally invasive technique of lumbar sympathectomy operative time, intraoperative complications were much less and recovery was significantly faster as compared to classical open method.

Keywords: Sympathectomy, Peripheral Arterial Disease, Buerger's disease, Causalgia, Hyperhidrosis

This is an Open Access article that uses a funding model which does not charge readers or their institutions for access and distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>) and the Budapest Open Access Initiative (<http://www.budapestopenaccessinitiative.org/read>), which permit unrestricted use, distribution, and reproduction in any medium, provided original work is properly credited.

Introduction

Buerger's disease is characterized by peripheral ischemia of an inflammatory nature with a self-limiting course. Occlusive peripheral arterial disease of the lower limbs (PAD) is a heterogeneous group of disorders with multifactorial etiology and clinical picture dominated by pain, with a wide variety of clinical and anatomical forms (etiopathogenic, morphological, topographical and evolutive), represented by atherosclerotic arteriopathy, vasospastic arteriopathy (Buerger's disease) and diabetic arteriopathy.

Therapeutic arsenal now has a range of options: conservative therapy, revascularization procedures (surgical or endovascular) and indirect operations - so-called hyperemia interventions (lumbar sympathectomy).

It is agreed that sympathectomy will lead to increases in cutaneous blood flow and altered pain transmission, this can be used to treat specific conditions such as Causalgia, symptomatic vasospastic disorders, hyperhidrosis in addition to inoperable distal arterial occlusive diseases [1,2,3,4,5].

The standard procedure for sympathectomy is open surgery.

The oblique retroperitoneal approach is popular because it provides good visibility, albeit at the expense of requiring a long skin incision. Laparoscopic surgery is a new approach that simplifies various surgical procedures.

Material and methods

In present study we have done comparison between minimally invasive procedure with the standard open approach for lumbar sympathectomy and there outcome.

Study Design

The present study was carried out as a prospective cross-sectional observational study.

Settings

The study was carried out at Tertiary Care Hospital, Lucknow. A total of 60 patients were enrolled in the study who were divided into two groups A and B of 30 each.

Inclusion criteria

1. Age between 17 to 80 years.
2. Ischemic rest pain that requires continuous analgesia for > 2 weeks
3. Ischemic foot ulcers that failed to heal for > 6 week
4. Distal gangrene which is limited to the fore foot

*Correspondence

Dr. Nadeem Ahmad

Assistant Professor, Department of General Surgery, Integral Institute of Medical Sciences Research(IIMS&R), Lucknow, Uttar Pradesh, India.

E-mail: dr.nadeemms05@gmail.com

Exclusion criteria

1. Unable to tolerate general anesthesia.
2. Refractory coagulopathy.
3. Patients with arterial lesions amenable to surgical intervention
4. Patients with deep infection or proximal gangrene that reach the heal
5. Patients with Ankle/Brachial pressure < 0.3
6. Presence of diabetic neuropathy
7. Patients with atherosclerosis

Intra-operative assessment

- (a) Operative time
- (b) Blood loss
- (c) Injury to the ureter or inferior vena cava
- (d) Peritoneal perforations

Post-operative assessment

- (a) Need for pain killers for the operative wound (measured by the number of days during which the patient requires Paracetamol in addition to the total number of Diclofenac injections)
- (b) Haematoma
- (c) Wound infection

(d) Incisional hernia

(e) Histological confirmation of the resected sympathetic segment

Recovery time

(g) Retreatment rate (follow up period)

Statistical tools employed

The statistical analysis was done using SPSS (Statistical Package for Social Sciences) Version 15.0 statistical Analysis Software. The values were represented in Number (%) and Mean±SD.

Result

This study was conducted in a tertiary care hospital Lucknow on the patients of peripheral arterial occlusive diseases or Buerger's disease who were admitted and operated to compare minimally invasive procedure with the standard open approach for lumbar sympathectomy and to assess the morbidity and evaluate the outcome in terms of operative time, complications and recovery time.

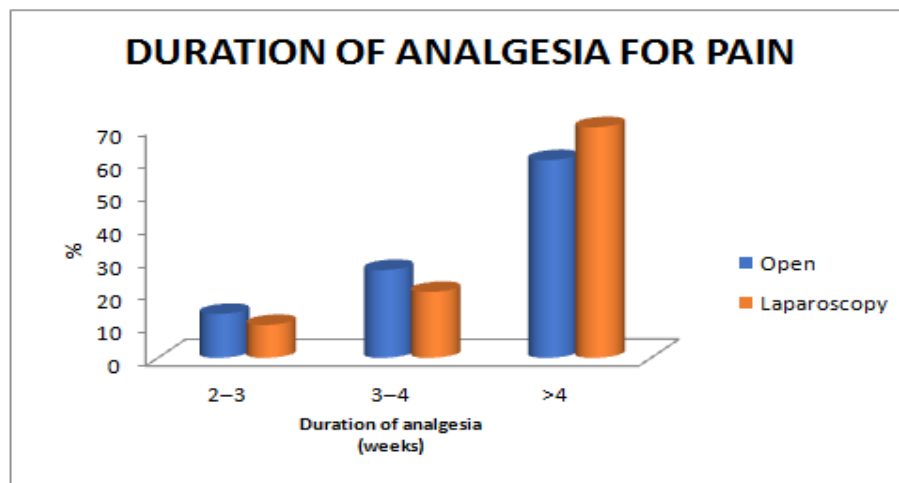
A total of 60 patients were enrolled in the study who were divided into two groups A and B of 30 each.

Group A(n=30) patients were operated by open method of lumbar sympathectomy.

Group B(n=30) patients were operated by laparoscopic method of lumbar sympathectomy.

Table 1: Duration of analgesia for pain

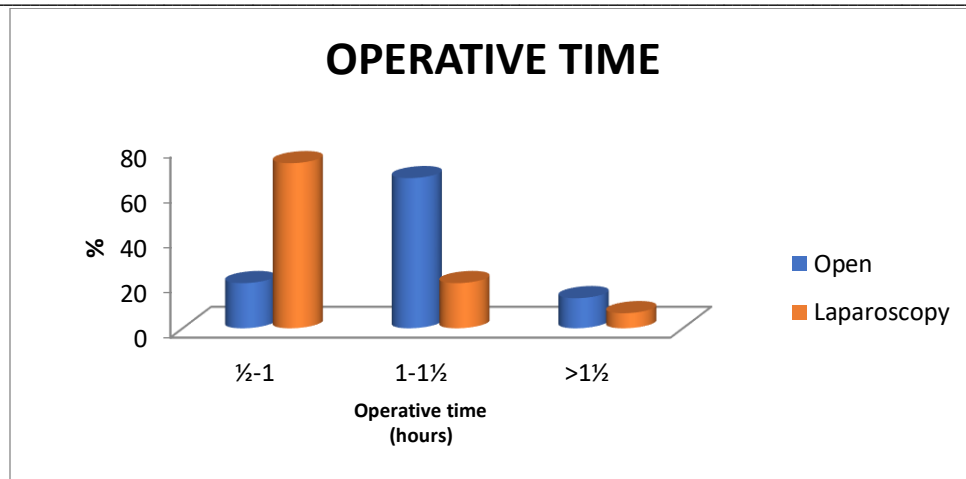
Duration of analgesia (weeks)	Open		Laparoscopy	
	No.	%	No.	%
2-3	4	13.33	3	10
3-4	8	26.67	6	20
>4	18	60	21	70
Mean±sd	3.97±0.72		4.1±0.66	

**Fig 1: Duration of analgesia for pain**

As seen in table no 1 maximum patients were taking analgesics for pain from more than 4 weeks. In group A total 18 out of 30 patients (60%) and in group B total 21 out of 30 patients(70%)were taking analgesics for pain from more than 4 weeks.

Table 2: Operative time

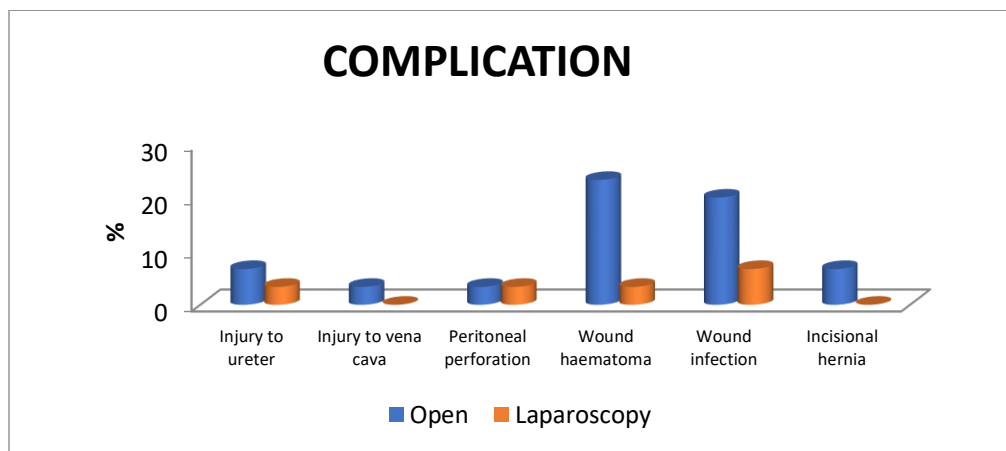
Operative time (hours)	Open		Laparoscopy	
	No.	%	No.	%
½-1	6	20	22	73.33
1-1½	20	66.67	6	20
>1½	4	13.33	2	6.67
Mean±sd	1.22±0.29		0.92±0.30	
p-value	0.0002			

**Fig 2: Operative time**

As seen in table no 2 in group A operative time in 6 patients was 1/2-1 hr, in 20 patients 1-1 1/2 hrs and in 4 patients operative time was more than 1 1/2 hrs while in group B in 22 patients operative time was 1/2-1 hr, in 6 patients 1-1 1/2 hr and in 2 patients it was more than 1 1/2 hrs. P value was 0.0002 which was significant.

Table-3: Complication

Complication	Open		Laparoscopy	
	No.	%	No.	%
Injury to ureter	2	6.66	1	3.33
Injury to vena cava	1	3.33	0	0
Peritoneal perforation	1	3.33	1	3.33
Wound haematoma	7	23.31	1	3.33
Wound infection	6	20	2	6.66
Incisional hernia	2	6.66	0	0
Mean±sd	3.17±4.95		0.83±1.35	
p-value	0.02			

**Fig 3: Complications**

As seen in table no 3 in group A there were ureteric injury in 2 patients, venacaval injury in 1 patient, peritoneal perforation in 1 patient, wound haematoma in 7 patients, wound infection in 6 patients and incisional hernia in 2 patients as intra operative and post operative complications while in group B there was ureteric injury in 1 patient, peritoneal perforation in 1 patient, wound haematoma in 1 patient, wound infection in 2 patient and there was no vena caval injury and incisional hernia as intra operative and post operative complications. P value was 0.02 which was significant.

Table 4: Recovery time

Time (days)	Open		Laparoscopy	
	No.	%	No.	%
3-5	0	0	5	16.67
5-7	4	13.33	20	66.67
>7	26	86.67	5	16.66
Mean±sd	7.73±0.68		6±1.15	
p-value	0.006			

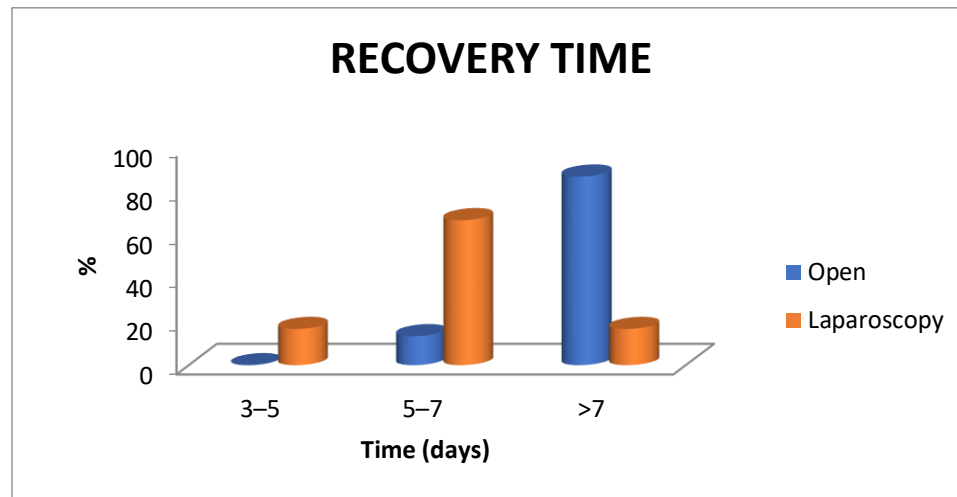


Fig 4: Recovery time

As seen in table no 4 in group A 4 patients recovered in 5-7 days and 26 patient took more than 7 days to recover while in group B 5 patients recovered in 3-5 days, 20 patients recovered in 5-7 days and 5 patients took more than 7 days to recover. P value was 0.006 which was significant.

Discussion

This was a prospective study carried out to compare minimally invasive procedure with the standard open approach for lumbar sympathectomy and to assess the morbidity and evaluate the outcome in terms of operative time, blood loss, complications and recovery time. In open method operative time was about 1-1.5hr in maximum patients. In 20 patients out of 30 (66.67%) it was 1-1.5 hrs and only in 6 patients (20%) operative time was between ½-1hr. In laparoscopic method operative time in 22 patients (73.33%) was ½-1hr and only in 6 patients (20%) it was between 1-1.5hrs. It suggests that operative time is less in laparoscopic method of lumbar sympathectomy than in open method. In a study included 8 male patients, the indications for lumbar sympathectomy were resting pain in 4 patients, nonhealing ulcer in 2 patients, and digital gangrene in 2 patients. All cases were completed retroperitoneoscopically, and no conversion to open surgery was required. The operating time for the first case was 72 minutes and steadily decreased with mean time for all the cases being 38 minutes. All patients had immediate warming of the limb. The chain was also confirmed histopathologically in all cases [6]. Palmar hyperhidrosis is obviously much more noticeable in affected individuals than plantar hyperhidrosis (PHH), but the latter can be just as socially and functionally disturbing as palmar hyperhidrosis, because it affects an area covered by shoes and other garments. Operating time for simultaneous right and left lumbar sympathectomies is about 72 min (52 - 95). We used to take longer to perform this surgery before adopting micro instruments, but the improvement could possibly be better explained by the learning curve than by the choice of instruments.

Complications in intra operative and post operative period were observed more in open method of lumbar sympathectomy. There were ureteric injury in 2 patients, venacaval injury in 1 patient, peritoneal perforation in 1 patient, wound haematoma developed in 7 patients, surgical site wound infection occurred in 6 patients and incisional

hernia developed in 2 patients while in laparoscopic method ureteric injury occurred in 1 patient, peritoneal perforation in 1 patient, wound haematoma in 1 patient and surgical site wound infection occurred in 2 patients. There was no vena caval injury and incisional hernia occurred in laparoscopic method surgical site wound haematoma and wound infection were 23.31% and 20% respectively in open method while in laparoscopy wound haematoma and wound infection were much lesser i.e. 3.33% and 6.66% respectively. It suggests that intra operative and post operative complications are more in open method than in laparoscopy.

Wound recovery was much earlier in laparoscopic method. Maximum 20 (66.67%) patients recovered in 5-7 days while in open method 26 (86.67%) patients took more than 7 days to recover. So surgical site wound recovery time goes in favour of laparoscopic method.

Conclusion

In minimally invasive technique of lumbar sympathectomy operative time, intraoperative complications were much less and recovery was significantly faster as compared to classical open method.

References

1. Olin JW. Thromboangiitis obliterans (Buerger's disease). *N Engl J Med*. 2000 Sep 21; 343(12): 864-9.
2. Shionoya S. Diagnostic criteria of Buerger's disease. *Int J Cardiol*. 1998 Oct; 66 Suppl 1: 5243-5.
3. Ali F, Abdurahman, Robert B. Rutherford. Lumbar sympathectomy, indications and technique. In: Robert B. Rutherford ed. *Vascular Surgery*. Philadelphia: Elsevier Saunders. 2005; 1223.
4. Mick Serpell. Role of the sympathetic nervous system in pain. In: *Anaesthesia and intensive care medicine*. The Medicine Publishing Company Ltd. 2005; 52-55.
5. Jeffrey W. Olin. Thromboangiitis obliterans (Buerger's disease). In: Robert B. Rutherford ed. *Vascular Surgery*. Philadelphia: Elsevier Saunders. 2005; 4.
6. Chander J, Singh L, Lal P et al. Retroperitoneoscopic Lumbar Sympathectomy for Buerger's Disease: A Novel Technique. *JLS*. 2004; 8(3): 291-296.

Conflict of Interest: Nil Source of support: Nil