OUTCOME OF LUMBAR SYMPATHECTOMY FOR PERIPHERAL VASCULAR DISEASE

Asif Mehmud Janjua, Eitezaz Ahmed Basheer

Combined Military Hospital Nowshera

ABSTRACT

Objective: To analyse the results of sympathectomy in cases of Peripheral Vascular Disease (PVD) in lower limbs.

Design: A quasi-experimental study.

Place and Duration of Study: The study was carried out at CMH Rawalpindi from June 1998 to June 2001.

Patients and Methods: In this study, 37 patients of PVD of lower limbs, irrespective of age and sex were evaluated. Lumbar sympathectomy was undertaken unilaterally in 29 (78.4%) patients, while in 08 (21.6%) patients bilateral procedure was carried out.. Patients with advanced disease 05 in number underwent conservative amputation of toes. Sympathectomy in each case was performed with standard technique and findings were recorded. Post operatively, all lumbar ganglia removed were sent for histopathological confirmation. Cases of PVD in which reconstructive surgery was not possible because of diffuse segmental nature of the occlusive lesion coupled with frequent lack of distal target vessel were included in this study.

Results: Of the 37 patients, 34 (91.9%) were males and 3 (8.1%) females, their mean age being 33.34 years. Rest Pain followed by intermittent claudication was the main mode of presentation. Indigenous cigarette smokers were 30 (81.1%) patients and 09 (24.3%) patients were diabetic. Out come measures based on subjective and objective improvements. Lumbar sympathectomy showed full recovery in 26 (70.37%) patients, marked improvement in 02 (5.4%) & no improvement in 09 (24.3%) cases. Only in 02 (5.4%) patients wound infection noticed, while no recurrence noticed during one year follow up.

Conclusion: Cases of PVD in which reconstructive vascular surgery is not feasible, sympathectomy has particular use for limb pain relief, ulcer healing and in avoiding or delaying limb amputation.

Keywords: Peripheral vascular disease, sympathectomy.

INTRODUCTION

Peripheral Vascular disease is due to insufficient arterial supply to meet nutritional requirements of the limb. Atherosclerotic stenosis and occlusion of major arteries is the main cause in old age. It begins with intimal thickening leading to fatty streaks and finally fibrous plaques. The most common sites of these atherosclerotic lesions are arterial bifurcation or areas of posterior fixation, where shearing forces and turbulent flow are the highest. Proximal arterial disease is more common and upper extremity involvement is less common [1].

Other causes of peripheral vascular disease include vasculitides, i.e Takayasus disease and Buergers disease. It is recognized as a non atherosclerotic, inflammatory occlusive process affecting small and medium sized arteries in distal extremities. It most frequently affects young men who are

Correspondence: Maj Asif Mehmood Janjua, Graded Surgeon, Combined Military Hospital, Nowshera.

smokers and usually results in severe disability & digital amputation [2,3]. Main predisposing factors include hypertension, diabetes mellitus, smoking, hyperlipidemia [4-6].

The usual presentation of PVD is pain associated with intermittent claudication or rest pain most commonly in the arch of foot & in calf of leg. Other clinical features may include asymmetric coldness of the skin, atrophy of skin, abnormal nail growth, ulceration and gangrene may occur at sides of nails or tips of digits [1,7].

Vascular evaluation demonstrates diminished or absent peripheral pulses. Arteriographic findings of lower limbs reveal segments of stenosis or occlusion with normal proximal and intervening vessels. The management of these patients includes arresting progression of disease, producing vasodilatation, relieving pain and local wound care. Revascularization is the mainstay of treatment but is not possible in some cases [1,8]. New modalities of treatment including intraluminal stents, CT guided sympathectomy, transposition of omentum [9-11] and intra-arterial streptokinase [12] as adjuvant therapy are still under consideration and results have not been fully assessed.

Sympathectomy has been applied in the management of peripheral vascular insufficiency for the past fifty years. Prior to the introduction of reconstructive arterial surgery, it remained the sole alternative to amputation in patients with occlusive vascular disease [13,14].

The onset of rest pain in an ischaemic limb indicates a serious threat to the limb and necessity for rapid intervention if a major amputation is to be avoided. However, many patients are not suitable for a reconstructive procedure, due to either poor general health of patient, widespread nature of the lesion or an absence of distal runoff. The large variety of vasodilator drugs available for use in management of limb arteriosclerotic disease is testimony to their ineffectiveness. While satisfactory results are possible with sympathectomy [15,16].

The role of sympathectomy for management of peripheral vascular disease is still controversial, but it may be helpful in selected patients. The sympathetic nerves have several functions which may be affected by sympathectomy i.e control of vasomotor tone of small arteries and arterioles, control of sweat gland secretions and involvement in transmission. In management of end stage peripheral vascular disease two effects could be of help that on the vascular system and that of the interaction on pain transmission [17]. Standard sympathectomy results in an increased resting blood flow to the extremities. This effect is produced mainly by dilatation of distal arteriovenous anastomosis in the limb, but it does not result in the improvement of muscle blood flow. Resting skin blood flow is regulated primarily by acral arteriovenous anastomosis innervated by sympathetic nervous system. Following sympathectomy the increase in blood flow entirely causes dilatation of this arteriovenous anastomosis with a little increase of skin capillary blood flow which is independent of sympathetic control. Increase of skin temperature is caused by this increase of the non nutritive blood flow through arteriovenous anastomosis [18]. Sympathetic denervation has a place in the management of PVD where reconstruction is not possible and has particular use for limb pain and may avoid or delay amputation [15].

To analyse the results of lumbar sympathectomy in cases of lower limb PVD.

PATIENTS AND METHODS

A quasi-experimental study was carried out at Combined Military Hospital Rawalpindi to analyse the results of sympathectomy in cases of PVD.

A total of 44 patients with PVD reporting to vascular surgery department of CMH Rawalpindi between June 1998 to June 2001 were initially included in this study. These patients included military persons along with

civilians from all walks of life. All patients were grouped together and evaluated irrespective of age and sex. Selection of patients consisted of those with intermittent claudication through varying degrees of severity, mild rest pain, constant rest pain and those with ulcer or gangrene. Associated h/o ischaemic heart disease (IHD), hypertension, diabetes and smoking were also noted. Cases in which reconstructive surgery was not possible because of diffuse segmental nature of occlusive lesion coupled with frequent lack of distal target vessel were included in this study. Those cases in which reconstructive surgery i.e. bypass surgery was possible were excluded from this study. All patients who required concomitant or subsequent vascular surgery were also excluded from this study. The diagnosis was based upon history and clinical examination of the patients and symptoms and signs were recorded on a proforma.

All the patients underwent investigations including full blood count, urine analysis, blood glucose profile, chest X-Ray, ECG, vasculitis screening, Doppler studies for ankle brachial index ratio and arteriography for occlusive level and distal run off.

Lumbar sympathectomy was done under general anaesthesia unilaterally and in some cases bilaterally in the same sitting.

Lumbar sympathectomy incision was made transversely 8-10 cm at umbilical level just medial to linea semilunaris. Rectus sheath and muscle was incised in the line of skin incision with splitting of external oblique and incision of internal oblique with diathermy. Transversalis fascia and muscle were separated without entering peritoneum. Retroperitoneal space in front of quadratus lumborum and psoas muscle was exposed lifting the ureter forward with peritoneum. Sympathetic chain on left side lying in ioose areolar tissue alongside the aorta was palpated as ganglionated cord against the vertebral bodies running just anterior to insertion of psoas muscle and lumbar vessels.

On the right side, chain lying behind the IVC which was retracted and lumbar veins passing in front of chain were safeguarded. Segments containing second and third ganglia were excised. Wound was closed in layers over a redivac drain.

Specimens of sympathetic chains excised were sent for histopathological confirmation to AFIP.

Hospital stay was 2-5 days and postoperative evaluation was done with follow up at six months and one year.

Main Outcome Measures:

The out come measures included subjective improvements in symptoms, return to normal life or job. Before final evaluation all treated cases were assessed for,

Subjective:

Patients were inquired about the improvements in their symptoms i.e. relief of pain in limb, improvement in walking and return to job or routine life.

Objective:

Increase in temperature of affected limb and healing of ulcers were tested and compared to preoperative findings.

On the basis of these outcome measures the results were graded accordingly.

Full Recovery:

It was defined as patients having no residual symptoms postoperatively after assessment for one year.

Marked Improvement:

It was defined as patients having some pain which is mild and relieved by analgesics during the one year postoperative assessment.

No Improvement:

Patients having no benefit of surgery with no improvement in symptoms. These patients were left with choice of conservative treatment or amputation of affected limb.

Data had been entered and analyzed using SPSS version 10.0. Descriptive statistics were used to describe the data.

RESULTS

Out of 44 patients initially included in this study. Six patients did not report back for follow up and one died of IHD. Therefore, we were left with 37 patients to evaluate. The frequency of patients with PVD was found to be maximum in the age group of 30 to 40 years followed by age group of 20 to 30 and above 40 years age. Average age being 33.34 years. Out of 37 patients with PVD 34 (91.9%) were males and only 3 (8.1%) were females with a male to female ratio of 11.3:1. All the 37 patients were treated surgically (table-1).

Modes of Presentation:

Rest pain in the foot and calf muscles was the most common symptom in 28 (75.7%) patients. The pain was associated either with gangrene or ulcer in 9 patients. Rest pain was observed with increased intensity at night, not allowing the patients to sleep. The patient would sit up in bed hanging his legs down and was relieved momentarily after an injection of narcotics.

Claudication Distance:

Total number of patients with varying degree of claudication was 09 (24.3%). The frequency of claudication was marked in maximum number of patients at 150 to 300 meters of physical activity and minimum at 600 to 700 meters.

Ulcer:

Ulceration was present in 7 (18.9%) patients. The ulcers were associated with intermittent claudication and rest pain. Intermittent claudication with ulcer was observed in 02 patients while 5 had rest pain with ulcers.

Gangrene:

It was present in 6 (16.2%) patients and was associated both with intermittent claudication and rest pain. In 5 patients there was rest pain with gangrene while in one patient intermittent claudication with gangrene was observed. In 5 patients the gangrenous part had to undergo amputation.

Personal Habits:

Indigenous cigarette smokers were 30 (81.1%) patients and non smokers were 07 (18.9%) patients.

Associated History of Diabetes:

About 09 (24.3%) patients were having diabetes mellitus and rest 28 (75.7%) patients were non diabetic.

Pulses:

The most affected artery was dorsalis paedis in 23 (62.2%) patients followed by posterior tibialis artery involvement in 18 (48.6%) patients. Occlusion of femoral artery was found only in 6 (16.2%) patients; where as popliteal artery was occluded in 11 (29.7%) patients.

Ankle Brachial Index (ABI):

Ankle brachial index measured was 0.4 in 22 (59.5%) patients, 0.6 in 3 (8.1%) patients and 0.7 in 12 (32.4%) patients.

Histopathology Results:

All lumbar ganglia sent for confirmation to histopathology department AFIP. In all cases it confirmed sympathetic chain excision.

Complications:

Only in 2 (5.4%) cases wound infection noticed.

Recurrence:

No recurrence has been observed during one year follow up.

Lumbar Sympathectomy Outcome:

Done in 37 patients and results are given in (table-2).

DISCUSSION

In our study the frequency of PVD patients was found to be maximum from 30 to 40 years with an average age of 33.34 years. Amin [19] observed the maximum number of patients in age group of 30 to 40 years with an average of 35.1 years. Lance [20] had maximum numbers of patients in the age group of 21 to 30 years. Gorden [21] found the

maximum patients in the sixth and eighth decades, belonging to atherosclerotic group. The difference in results is because of the reason that our study includes cases of PVD secondary to any cause but in Lance study it includes only Buergers disease cases where as Gorden had atherosclerotic cases.

In the present study it was observed that PVD affected mostly the males in 91.9% cases with male to female ratio of 11.3:1. This is in concurrence with the study of Amin and Gorden with a male to female ratio of 99:1, and 92:8 respectively.

The disease is practically confined to smokers i.e. 81.8% patients in our study in comparison to 98% Amin and 92% in Lance studies.

Rest pain was the chief complaint in our study and this was observed in 75.7% cases. Baker [22] and Waldran [23] while evaluating the results of sympathectomy reported 75.7% of patients had rest pain as the main complaint while Amin had 66% cases with this symptom [19].

In the present study the claudication distance was 150 to 300 meters in majority of patients with intermittent claudication. This distance in Amin study was 300 to 400 meters in maximum cases. Thoden [24] observed in his patients claudication at 200 to 600 meters while Gorden found 30 to 70 meters distance in 42 out of 62 patients [21].

In the present study 18.9% cases had ulceration either associated with rest pain or intermittent claudication. Amin had 45% cases having ulcer while Janoff [25] had 34% cases with ulcers accompanying PVD.

Gangrene in our study observed in 16.2% cases. Amin described four principal symptoms in descending order of occurrence, the fourth being gangrene. Gorden observed gangrene also as third common symptom [21].

Clinical examination of peripheral vessels of lower limb showed signs of occlusion; the most affected were dorsalis paedis and posterior tibial arteries. These observations are similar with the findings of Amin, Thoden and Janoff studies [19,24,25].

Table-1: Treatment given (n=37).

Treatment	No. of Patients	Percentage
Unilateral lumbar sympathectomy	29	78.4%
Bilateral lumbar sympathectomy	08	21.6%

Table-2: Lumbar sympathectomy outcome (n=37).

Results	No. of Patients	Percentage
Full recovery	26	70.3%
Marked improvement	02	5.4%
No improvement	09	24.3%

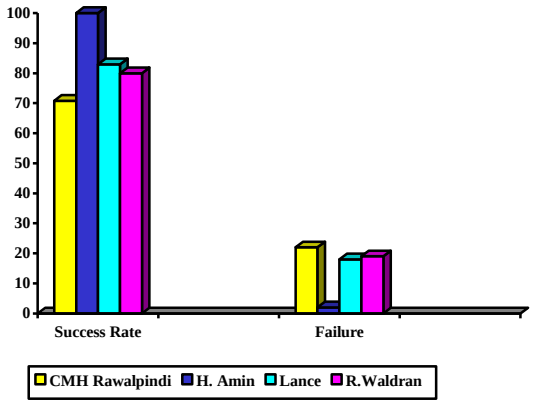

Figure: Comparison - Outcome of lumbar sympathectomy with conservative amputation in PVD cases [19,20,23].

Conservative amputations had to be undertaken in 13.5% cases in this study where as Amin had these being 15% patients, Thoden in 21% patients and Janoff in 19% patients [19,24,25].

Our policy of sympathectomy with conservative amputation had 75.7% success rate where as Waldran had 79%, Lance 82.5% and Amin 99% cases with marked improvement in symptoms. In other studies done, full recovery and marked improvement are considered as successful (figure). The probable reason for a difference in success rate between our study and Amin's is that even the minor improvement in symptoms in Amin's study is considered successful [19].

CONCLUSION

This study concludes that the role of surgical sympathectomy for management of PVD is still helpful in selected cases in lower limbs. Cases in which reconstructive arterial surgery is not feasible, sympathetic denervation has particular use for limb pain relief, ulcer healing and in avoiding or delaying amputation of affected limb.

REFERENCES

1. Murie JA. Arterial Disorders. In: Russels RCG, Williams NS, Bulstrode CJK, editors. *Bailey & Love Short Practice of Surgery*. 23rd ed. London: Arnold; 2000. p. 200-34.
2. Choi ET, Eagon JC. Occlusive arterial disease. In: Dopherty GM, Meko JB. *The Washington Manual of Surgery*. Philadelphia: Lippincott; 1999. p. 323-38.
3. Kokhan EP, Pinchuk OV. [The application of Lumber Sympathectomy in Complex of Treatment of Obliterating Atherosclerosis] [Article in Russian]. *Klin Khir* 1998; (7): 7-9.
4. Hashim R, Khan FA, Khan DA, Shaukat A. prevalence of Macrovascular complications in diabetics of Wah, district Rawalpindi. *J Pak Med Assoc* 1999; 49(1): 8-11.
5. Arain GM. Chlamydia pneumonia: can it cause atherosclerosis? [Editorial] *J Pak Med Assoc* 1997; 47(10): 242.
6. Dadavani SA, Uspenskii LV, Lapchinskii VA, Ulianov DA, Artiukhina EG. [Diagnosis and treatment of diabetic angiopathy of the lower extremities]. [Article in Russian]. *Khirurgiia (Mosk)* 1994 May; 5: 36-8.
7. Hasan-Khodja R., Le Bas P, Pittaluga P, Batt M, Declemy S, Bariseel H. Abdominal aortic aneurysm and lower-limb Occlusive arterial disease. *J Cardiovasc Surg (Torino)* 1998; 39(2): 141-5.
8. al Zahrani HA. Arteritis: experience in Jeddah, Saudi Arabia. Cardiovasc Surg 1993; 1(3): 215-9.
9. Singh I, Ramteke VK. The role of omental transfer in Buerger's disease: New Delhi's experience. *Aust N Z J Surg* 1996; 66(6): 372-6.
10. Gullino D, Gagliano A, Giordano O, Rachectta A, Gullino E. [Transposition of omentum to the thigh, for the vascular salvage of limb. A propos of 17 cases]. [Article in French]. *J Chir (Paris)* 1995; 132(2): 70-9.
11. Shen WL, Yang ZM, Jin LR, Wei JJ, Luo YG, Peng YB. Omental autotransplantation in treatment of thromboangiitis obliterans. *Chin Med J (Engl)* 1990; 103(3): 248-50.
12. Hussein EA, el Dorri A. Intra-arterial Streptokinase as adjuvant therapy for complicated Buerger's disease: early trials. *Int Surg* 1993; 78(1): 54-8.
13. Cotton LT, Cross FW. Lumber sympathectomy for arterial disease. *Br J Surg* 1985; 72(9): 678-83.
14. Claeys LG. The use of lumbar Sympathectomy for peripheral vascular disease (PVD). *World J Surg*. 1999; 23(9): 981-3.
15. Holiday FA, Barendregd WB, Slappendel R, Crul BJ, Buskens FG, van der Vliet JA. Sympathectomy in critical limb ischaemia: surgical, chemical or not at all. *Cardiovasc Surg* 1999; 7(2): 200-2.
16. Shiyonoya S. *Buerger's disease: Pathology, diagnosis and treatment.* Japan: The University of Nagoya Press; 1990.
17. Levin JO, Connar JF, Grady, Carol J Moore, Hallux Amputation in Combination with a Lumber Sympathectomy for treatment of a non-healing ulceration in patient with Buerger's Disease. J Foot and Ankle Surg (American) 1996; 35: 339-43.
18. AbuRahma AF, Robinson PA. Clinical parameters for predicting response to lumbar sympathectomy in patients with severe Limb Ischaemia. *J Cardiovasc Surg (Torino)* 1990; 31(1): 101-6.

19. Amir H. Sympathectomy and limb salvage in peripheral vascular insufficiency: a clinical study of 100 patients. *Cent Afr J Med* 1990; 36(10): 237-41.

20. Lance BJ, Kirschenbaum SE. Distal Ischemia with digital gangrene, secondary to Buerger's disease. *J Foot Surg* 1991; 30(6): 534-41.

21. Gordon A, Zechmeister K, Collin J. The role of sympathectomy in current surgical practice. *Eur J Vasc Surg* 1994; 8(2): 129-37.

22. Baker DM, Lamerton AJ. Operative lumbar sympathectomy for severe lower limb ischaemia: still a valuable treatment option. Long-term folloe-up. *Ann R Coll Surg Engl* 1994; 76(1): 50-3.

23. Waldron R, Copeland G, Murphy AF. Results of lumbar sympathectomy five years later. *Br J Clinical Practice* 1987; 41(5): 729.

24. Lee BY, Madden JL, Thoden WR, Mc Cann WJ. Lumbar sympathectomy for toe gangrene. *Am J Surg* 1983; 145(3): 398-401.

25. Janoff KA., Phinney ES., Porter JM. Lumbar sympathectomy for lower extremity vasospasm. *Am J Surg* 1985; 150(1): 147-52.