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Study of indications, techniques and results of operations on the sympathetic nervous system

G. P. Varshney

Associate Professor, Department of Surgery, United Institute of Medical Sciences, Prayagraj, Uttar Pradesh, India

Sabhya Varshney

P.G. IIIrd year, Department of Pathology, Shri Ram Murti Smarak Institute of Medical Sciences, Bareilly, Uttar Pradesh, India

Ankit Raj Varshney

Consultant, Department of Medicine, Navjeevan Hospital, Aligarh, Uttar Pradesh, India

Amit Varshney

Professor and Head, Department of Medicine, United Institute of Medical Sciences, Prayagraj, Uttar Pradesh, India

Anima Dayal

Senior Gynaecologist and Director, Vrinda Hospital Multispecialty, Aligarh, Uttar Pradesh, India

Abstract--Pain is an unpleasant sensation related to a noxious stimulus and accompanied by emotional and physiological reactions. Many factors affect these responses and the level of pain perceived from a given stimulus varies, both between subjects and within the same subject on different occasions. It is often assumed that all pain is similar but an individual's sensitivity to different types of experimentally induced pain is variable. This work was carried out on selected group of patients in Department of Surgery, underwent lumbar sympathectomy, cervical sympathectomy and celiac ganglion block were admitted during three years includes 55 cases i.e. 34 cases of lumbar sympathectomy 2 cases of splanchnicectomy, 3 cases of cervical sympathectomy and 16 cases of coeliac ganglion block. All the patients studied were smoker except the patients who were women and underwent sympathectomy. The most common presenting symptoms was pain in the lower limbs. Most often it was associated with ulcer or frank gangrene. Wasting of the foot and leg muscles was seen in quite a considerable number of the patients about 37%. Pain was relieved in approximately 88% patients underwent

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Corresponding author: Varshney, A.; Email: dr.amit.varshney2020@gmail.com

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sympathectomy. A policy of sympathectomy with conservative amputation gave good to excellent results in more than 75% of patients suffering from peripheral vascular occlusive diseases and no major complications were attributed to the sympathectomies. Coeliac ganglion block is not a commonly performed procedure while splanchnicectomy is very rarely performed. Celiac Ganglion Block was performed mainly in the patients suffering from upper abdominal malignancies and pain being the major indication.

Keywords---Lumbar sympathectomy, coeliac ganglion block, smoker.

Introduction

Pain is an unpleasant sensation related to a noxious stimulus and accompanied by emotional and physiological reactions. Many factors affect these responses and the level of pain perceived from a given stimulus varies, both between subjects and within the same subject on different occasions. It is often assumed that all pain is similar but an individual's sensitivity to different types of experimentally induced pain is variable¹.

Pain is common complaint in the patients suffering from carcinoma in the upper abdomen and the patients of (Peripheral vascular occlusive disease. But the type of pain of these two conditions differs as first is visceral pain and second is somatic in origin however both respond to sympathetic inhibition but the mechanism regarding relief of pain differs. In first condition i.e. pain of cancer is relieved by celiac plexus block and splanchnic nerve resection, as these are the pathways for the upper abdominal visceral pain; on the other hand pain due to ischaemia in peripheral vascular occlusive diseases responds to the sympathectomy of that limb, as it improves the blood supply of skin and subcutaneous tissue of that limb by opening of the collaterals².

Beside relieving pain and improving the blood supply of the limbs sympathectomy is also indicated in some other conditions like hyperhidrosis, causalgia & Raynaud's syndrome. Other conditions for which Sympathectomy has been found useful includes poliomyelitis in which circulation of the affected limb is improved. Some cases of essential hypertension also respond to sympathectomy. Here fall of blood pressure occurs due to decrease in peripheral resistance³.

The sympathectomy in limbs minimizes the level of amputation or prevents amputation in the ischaemic limbs whereas coeliac ganglion block in patients of intractable pain that frequently accompanies primary diseases like non resectable or recurrent carcinoma of stomach, pancreas liver or gallbladder, not amenable to surgery, radiotherapy or chemotherapy provides palliative and symptomatic relief which is the major goal of treatment in such patients. If narcotics are employed. Constant nursing care is necessary because of the problems of addiction, loss of appetite constipation and dulled sensorium or an alteration of personality. Here is a situation where one can go for celiac plexus block or splanchnicectomy.

In the present study the effort has been made to operative and injective procedures on the study sympathetic system and its role in cure and palliation of some the nervous diseases. Henry Haimovici et al, evaluated lumbar sympathectomy and analysis of results obtained from 200 lumbar sympathectomies carried out for arterial insufficiency in the lower extremities in 171 patients with a follow up ranging from one to ten years. Patients who had combined arterial grafts and sympathectomy were excluded from their study. Results of 200 cases of advanced occlusive arterial disease were reviewed⁴. Author advocated lumbar sympathectomy when reconstructive arterial surgery is not feasible. Slight improvement in intermittent claudication rarely justifies the procedure for this symptom alone. Its greatest usefulness was exerted upon rest pain (71%) and limited necrotic lesion of toes. Henry Hamovici found that vital salvage of limbs was achieved in a relatively high of cases, Importance of adequate postop care of existing foot lesions was emphasize by the Author.

Conlon K.C. et al, performed 135 upper dorsal sympathectomy in 75 patients for palmar hyperhidrosis causing significant social and psychological problems for the patients. The results of conservative measures such as anticholinergic drugs, sedatives, antiperspirant creams, psychotherapy and iontophoresis are generally disappointing, sympathetic denervation abolishes eccrine secretions and thus gives long lasting relief of symptoms.

Lebovits A.H. et al, reviewed pain management of pancreatic carcinoma. This paper reviews the most used pain management interventions with patients commonly who have carcinoma of pancreas. Prior research has focused on the use of celiac plexus block. Other methods such as pain medication as well as chemical and surgical splanchnicectomy are also reviewed. Results of this review point to very successful pain relief rates with celiac plexus block and the urgent need for vigorous evaluation studies of pain management techniques in patients with pancreatic carcinoma⁵.

Saltzburg D described pain management of pancreatic carcinoma. Potentially useful modalities of pain control pancreatic cancer include antitumor therapy in pharmacotherapy, (Analgesics) C. G. block, splanchnic nerve block, intercostal nerve block and psychological intervention. These modalities are often used concurrently in treating the multiple dimensions that affect pain. Although thorough assessments are lacking, preliminary data suggest that antitumor chemotherapy and radiotherapy and celiac plexus block are especially useful modalities of pain⁶.

Material and Methods

This work was carried out on selected group of patients in Department of Surgery underwent lumbar sympathectomy, cervical sympathectomy and celiac ganglion block were admitted during three years includes 55 cases i.e. 34 cases of lumbar sympathectomy 2 cases of splanchnicectomy, 3 cases of cervical sympathectomy and 16 cases of coeliac ganglion block.

Patients were divided into two groups according to the surgical procedure to be performed. Ist group of patients. underwent sympathectomies were suffering from

peripheral vascular occlusive diseases, while IInd group of patients underwent splanchnicectomy and coeliac ganglion block were having mainly pain in upper abdomen due to malignant or benign lesions. Patient's history taken and physical examination was done thoroughly. They were investigated and extent & nature of the disease were ascertained. A common performa for both the two groups was made.

All patients operated upon were kept nil orally since night prior to the operative day and 0.6 mg atropine I. M. was given about half an hour before operation General anaesthesia was given in all patients. But coeliac plexus block was done under local anaesthesia in these patients xylocaine sensitivity was done. Consent was taken for all procedures and various procedures performed were, a) cervical sympathectomy, b) lumbar sympathectomy, c) splanchnicectomy, d) coeliac ganglion block.

Results

This is a study of 55 patients, who underwent sympathectomy (Lumbar & Cervical), splanchnicectomy and coeliac ganglion block; was carried out in Deptt. of General Surgery

Table 1
The age and sex of patients underwent sympathectomy

Age in years	Total cases	Males	Females
0 - 10	0	0	0
11-20	2	1	0
21-30	15	14	1
31-40	11	10	1
41-50	5	5	0
51-60	2	2	0
61-70	2	2	0
70+	0	0	0
	37	35	2

Table 1 shows the incidence age and sex of patients underwent sympathectomy, who were suffering from peripheral vascular occlusive disease (Buerger's disease) were maximum in the age group of 21-30 years.

Table 2
Incidence of smoking in patients underwent sympathectomy

Smoker	Non Smoker	Total
No. of Patients	35	2
		37

All the patients studied were smoker except the patients who were women and underwent sympathectomy. Majority were bidi smokers.

Table 3
The incidence of various symptoms in patients underwent sympathectomy

Symptoms	No. of Cases with specific symptoms	Total No. of cases	Percentage
Intermittent Claudication	29	37	78.37%
Rest pain	25	37	67.56%
Ulceration	20	37	54.05%
Gangrene	18	37	48.65%
Muscle wasting	14	37	37.83%
Sensory Symptoms	14	37	37.83%
Raynand's phenomeon	1	37	2.07%

The most common presenting symptoms was pain in the lower limbs. Most often it was associated with ulcer or frank gangrene. Wasting of the foot and leg muscles was seen in quite a considerable number of the patients about 37%.

Table 4
Pain relief in patients underwent sympathectomy

	GOOD	FAIR	POOR	Total No.
No. of the Patients	32	2	3	37
Percentage	86.49	5.4	8.11	100

Pain was relieved in approximately 88% patients underwent sympathectomy.

Table 5
Healing of ulcers in patients underwent sympathectomy

Healing of ulcers	Early	Delayed	Not healed	Total no.
No. of Patients	11	5	4	20
Percentage	55	25	20	100

Early healing was seen in 55% of patients and approximately 20% showed non healed ulcers.

Table 6
Result of treatment of coeliac ganglion block

Degree of relief	No. of patients	Percentage
Good to Excellent	15	93.75
Fair	1	6.25
Recurrence of pain	0	0
Total No.	16	100

Approximately 93% of patients had good to excellent relief with coeliac ganglion block.

Discussion

Incidence of peripheral vascular occlusive disease amongst the patients admitted to the department of general surgery of this hospital; during the last three years were 1.08%. The present study includes 37 patients of peripheral vascular occlusive disease who underwent various sympathectomy operations. Our hospital records show that 0.7% patients of PAOD were admitted during the period 72-79 out of total 15,233 surgical admission. Talwar and Roy in a study at the All India Institute of Medical Sciences reported an incidence of 0.9%. In our study the incidence of operative & procedures on the sympathetic nervous system was injective 0.73% as compared to all other operations⁷. Regarding sympathectomies, the age incidence was found to be maximum in the age group of 21-30 years whereas average age of the patients was 33.50 years. Haimovici H. found 63% of the total number of the patients who underwent lumbar sympathectomy were in 5th & 6th decades in his series of 171 patients. More than of these patients had diabetes mellitus associated arteriosclerosis obliterans. We did not find any association. 5th half with such Baddeley reported high incidence of upper dorsal sympathectomies in young patients of Primary disease & preponderance of females i.e. 76.3% Raynaud's and maximum sympathectomies were performed in age group 10-30 years. Fulton R.L. et al reported the average age 64 years whereas patient's ages ranged from 33 to 80 in the patients who underwent lumbar sympathectomies. In the present study it was seen that peripheral vascular diseases affected mostly males (94.59%) and rarely females (5.41%). Sex was also related to the type disease and extremity involved. Lower extremity was frequently involved in males while in the females, upper extremity was involved. Fulton R.L. et al in his 54 patients, only one patient was female who underwent lumbar sympathectomy. This is in concurrence with the study of Lee and Turner⁸.

In our series majority of sufferers belonged to lower socioeconomic status. Most of them were the Agricultural workers who worked in the fields bare footed and thus more liable to injure their feet. They lived on poor diet. Similar findings have been reported by Razdan, and Stojanovic et al 1973. All except two patients were smokers and both of these were females, most of them were heavy smoker, smoking 20 bidis/cigarette/day and majority were bidi smokers. An intimate relationship of the disease and smoking has been reported by many authors including Szilagyi, Reddy & Singh, and Wong et al⁹.

The lower limbs were involved in majority of these cases while upper extremities were involved in quite a few patients needing surgical interference. Pain was the chief complaint in the form of intermittent claudication (78.37%) and rest pain (67.56%) in our series.

Campbell et al, reported an incidence of 65.1% in 149 cases. Horner et al, in a 12 years study reported intermittent claudication in 74% of his non diabetic patients and 58% in diabetics while in our study all the patients were non diabetics. Haimovici H. et al, studied 171 cases in a 10 years period. Their series included 36.4% patients of arteriosclerosis. They found that 35% of the patients complained of intermittent claudication. Lee & Turner in their study of 46

patients with peripheral vascular disease found that 76% suffered mainly from intermittent claudication¹⁰.

In the present study the claudication distance was 300-400 meters in majority of the patients. Rest pain was observed in 67.56% of cases. It either occurred alone or in various combinations ulcer and gangrene, threatened gangrene and intermittent claudication. De Takat and Berry et al, grouped their patients according to the five principal symptoms of which rest was one. Gillespie also noted that rest pain was pain one of the main symptoms complained of. Horner et al, found 50% of his patients reported were having rest an incidence of pain. Haimovici et al, observed rest pain in 25.5% cases¹¹.

In the present study of 37 patients ulceration was found as the third common symptom (incidence 54.05%). The toes were the maximally affected sites. Next in frequency were the foot ulcers. Haimovici et al noted ulceration in 55% of their 171 cases. Szilagyi et al, in a study of 22 cases found ulceration alone in 22% cases. Mozes et al, in a study of 22 cases found ulceration in combination with gangrene in 63.6% cases. Wong et al, found ulceration in 56.4% associated with gangrene in 20.6% cases¹².

Results of Sympathectomies were assessed by various criteria like relief of pain, healing of ulcers, Arrest or spread of gangrene, minor or major amputations performed, Healing of stumps and need of higher amputations. In our series 15 (40.54%) patients showed excellent results, in 13 (35.13%) patients good results were obtained. Fair results were seen in 5 (13.51%) while in 4 (10.81%) patients results were poor. Beneficial results following sympathectomy were also reported by Gillespie et al, Szilagyi et al , and Fluton et al¹³.

No major complications were seen in our study. Only one patient died after one month of operation. In which the cause of death was neither related to the disease nor to the treatment. Fulton & Blakely wrote a strong condemnation of lumbar sympathectomy putting a question mark on it and did have a significant mortality (11.1%) but none were directly related to the procedure however a larger series with multiple etiologies reported an overall mortality of only 0.13%. This rose to 0.78% for patients over 50 years of age (Shumacher H.B.)¹⁴.

Conclusion

An analysis of patients who underwent Lumbar and cervical sympathectomy, reveals that frequency of Sympathectomy is 0.73% of all routine operative procedures, sympathectomies were frequently performed in young, mostly belonging to 21-30 years of age and Thromboangitis obliterans (Buerger's disease) was the commonest indication for sympathectomy. All the patients were males except two females and all males were smokers. Majority of sufferers belonged to the low socioeconomic status with poor hygiene and the chief complaints were intermittent claudication, rest pain, ulceration and gangrene in decreasing order. Peripheral arteries were involved in an ascending order. Lumbar sympathectomy was more commonly performed operation as compared to cervical sympathectomy as the lower limb involvement was more frequent. A policy of sympathectomy with conservative amputation gave good to excellent results in more than 75% of

patients suffering from peripheral vascular occlusive diseases and no major complications were attributed to the sympathectomies.

Coeliac ganglion block is not a commonly performed procedure while splanchnicectomy is very rarely performed. Celiac ganglion block was performed mainly in the patients suffering from upper abdominal malignancies and pain being the major indication. Most patients who underwent celiac ganglion block were of 50 or more than 50 years of age, whereas mean age was 50.99 years. 6 out of 16 patients were females, except one, all patients experienced relief from pain, which lasted till the time of discharge.

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