Lumbar chemical sympathectomy in peripheral vascular disease: Does it still have a role?

Prabhu N. Nesargikar*, M.K. Ajit, Paul S. Eyers, Barry J. Nichols, John F. Chester

Department of Vascular Surgery and Anaesthesia, Taunton and Somerset NHS Trust, Musgrove Park, Taunton TA1 5DA, United Kingdom

**Article info**

*Article history:* Received 7 December 2008
Received in revised form 16 January 2009
Accepted 19 January 2009
Available online 27 January 2009

**Keywords:**
Lumbar chemical sympathectomy (LCS)
Peripheral vascular disease (PVD)
Ischemic rest pain
UK and Irish vascular surgical practice

**Abstract**

Introduction: Lumbar chemical sympathectomy (LCS) is used principally in inoperable peripheral vascular disease (PVD) to alleviate symptoms of rest pain and as an adjunct to other treatments for ulcers. No guidelines currently exist in the UK for its use in PVD. The aim of this study was to evaluate the role of LCS with regard to indications and outcomes in the UK and Irish vascular surgical practice.

Methods: Specifically designed questionnaires were sent to Vascular Surgical Society members. The questions related to their current use of LCS including indications, outcome parameters, use in diabetics and complications encountered.

Results: Four hundred and ninety postal questionnaires were sent out and 242 responses (49%) were received. Seventy five percent of the respondents (n=183) felt that LCS had a role in current practice. Seventy eight percent (n=144) performed less than 10 procedures per year and 3% (n=5) more than 20 per year. Eighty percent (n=145) were performed by anaesthetists, 12% (n=23) by radiologists and 8% (n=15) by surgeons. Inoperable peripheral vascular disease with rest pain was the main indication in over 80% of responses with 27% using it for the treatment of ulcers. Only 21% used LCS in diabetics. Clinical improvement was used to assess the outcome following LCS in 96% of responses. Complications included neuralgia, ureteric damage and paraplegia following inadvertent extradural injection.

Conclusion: Although no clear guidance exists for the use of LCS in PVD, the majority of respondents continue to use it. Indications and outcomes are documented in this study of UK and Irish vascular surgical practice.

1. Introduction

Peripheral vascular disease (PVD) of the lower limbs is the most common pathology seen in vascular surgical practice. The management of patients with unreconstructable distal disease with rest pain has always been difficult, with the obvious endpoint being limb amputation. Attempts to improve the quality of life by alleviating rest pain without limb ablation have led to the development of lumbar sympathectomy.

Lumbar chemical sympathectomy (LCS) is used primarily in the treatment of ischemic rest pain with unreconstructable distal vessels and in the management of arterial ulcers, but rarely for intermittent claudication. Symptomatic improvements following LCS in patients with critical leg ischemia have been demonstrated in cohort studies and randomised controlled trials, but most have failed to identify objective benefits. LCS has also been used in alleviating the symptoms of Paget’s disease of bone, hyperhidrosis, and pain associated with chronic pancreatitis and inoperable carcinoma of the pancreas.

Although no guidelines currently exist for the use of LCS in PVD, many vascular surgeons continue to use it. This study was undertaken to document their indications and outcomes.

2. Materials and methods

Four hundred and ninety specifically designed postal questionnaires were sent to vascular consultants and associate specialists across the UK and Ireland using contact details from the Vascular Surgical Society of UK (Fig. 1). Questions related to LCS and its indications, outcomes and complications. Responses were received from 84 vascular departments across both countries.

---

*Corresponding author. Flat 1, South Terrace Court, Stoke on Trent ST4 4BZ, United Kingdom. Tel.: +44 1782 556716 (office); fax: +44 1782 556576.
E-mail address: drbhu@hotmail.com (P.N. Nesargikar).
3. Results

Only 242 of the possible 490 (49%) questionnaires were received. Although there were no apparent systematic differences between the responders and non-responders, the possibility exists that only those who believed in the role of lumbar chemical sympathectomy replied, and those who feel it has no role did not reply. The poor response may reflect the difficulty in defining an exact role for the procedure.

Of the 242 responses, 75% (n = 183) felt that LCS had a role in current practice with only 25% (n = 59) disagreeing. The procedure was performed predominantly by anaesthetists (80% (n = 145)) but also by radiologists (12% (n = 23)) and surgeons (8% (n = 15)). In some institutions, the procedure was assigned to the pain team (n = 8).

With regard to indications, the majority of respondents used rest pain with unreconstructable distal arterial disease as their main criteria. Ulcers and trash feet were the other common indications. Some respondents considered augmenting revascularisation and lower limb amputation procedures with LCS, but use in claudication was rare. Other indications included Raynaud’s disease, Buerger’s disease and complex regional pain syndromes (Fig. 2).

The number of LCS procedures undertaken by individual vascular surgeons varied from one to forty per year and is summarised in Table 1. In diabetic patients, 20% (n = 38) of surgeons had used LCS with 45% (n = 80) willing to consider it. Thirty five percent (n = 65) never used it in diabetics. Twenty two percent (n = 40) would repeat LCS in the same patient.

Regarding outcome assessment following LCS, the majority used symptomatic “clinical improvement” as an indicator, along with rise in temperature and a dry foot (Fig. 3). Complications of LCS included genitofemoral and femoral nerve neuralgia, retroperitoneal haematoma, ureteric damage and paraplegia secondary to inadvertent extradural injection.

4. Discussion

In the UK, around 20% of people over the age of 60 have some degree of peripheral arterial disease, and both diabetes and smoking are contributing to an increasing incidence. An initial presentation with intermittent claudication has usually been managed conservatively with the encouragement of exercise and cessation of smoking, together with risk factor modification.

Worsening PVD with rest pain has always been more difficult to manage when vascular reconstruction proves impossible, and many clinicians have used lumbar sympathectomy to alleviate symptoms and improve quality of life. More recently, prostaglandin synthetase inhibitors have been used as an alternative to sympathectomy because the results are similar, but long term benefits remain poor.
Lumbar sympathectomy acts as a vasodilator by decreasing sympathetic tone, so improving tissue oxygenation. This principle underlies its use in ulcer healing. It also decreases pain by interrupting sympathetic–nociceptive coupling and by a direct neurolytic action on nociceptive fibres. Lumbar sympathectomy can be performed using both open surgical and laparoscopic techniques, and non-invasively through chemical injections, with both techniques offering similar outcomes. Although surgical sympathectomy is still being carried out, LCS has largely replaced it.

5. Evolution of LCS

LCS was first described in 1926 when Doppler reported treating lower limb PVD by exposing and painting the femoral artery with phenol. In 1949, the British surgeon Haxton published results of injecting the lumbar sympathetic chains with phenol in patients with occlusive arterial disease. He reported considerable symptomatic relief in patients with ischemic rest pain and in claudicants. In 1970, William Reid wrote on the technique of phenol injection of the sympathetic chain along with its indications and outcomes. In 1976, anaesthesiologist Robert Boas demonstrated fluoroscopic monitoring for positioning needles and injecting neurolytic solutions, which forms the basis for modern LCS. In some centres, CT fluoroscopy-guided LCS has been shown to be safe and effective. Although surgeons were pioneers in the early development of LCS, anaesthetists and radiologists have developed it further and now more usually perform it.

As LCS was predominantly carried out as a palliative procedure in inoperable PVD, assessing the outcome following LCS was by and large measured as an improvement in the quality of life. Depending on the indications, the other outcome parameters considered include healing of peripheral ulcers or improvement in claudication distance. A sudden increase in skin temperature in the sock distribution has been advocated as an objective method of assessing the outcome, though the response is temporary. Skin wrinkling and relief of cutaneous allodynia have also been reported, but the majority of these assessments are immediate, temporary and unreliable.

6. Lumbar sympathectomy – chemical or surgical?

Earliest reports in the literature about surgical lumbar sympathectomy date back to 1924, when Adson in the USA and J. Diez in Argentina resected the lumbar sympathetic chains in the treatment of thromboangitis obliterans. Sir James Learmonth was subsequently knighted for performing operative sympathectomy on King George VI in 1949. With advancements in technique and technology, lumbar chemical sympathectomy has become more popular.

In 1999, Holiday and his colleagues from the Netherlands published results from their practice which showed 1-year limb salvage rates of 61% for surgical lumbar sympathectomy and 58% for chemical lumbar sympathectomy. Recently, there has been renewed interest in laparoscopic lumbar sympathectomy in PVD as being more definitive and safer than chemical sympathectomy. Piatko et al in 2004 showed that chemical sympathectomy was equal to surgical lumbar sympathectomy in terms of outcomes.

7. Evidence for the efficacy of lumbar sympathectomy in PVD

There have been both randomised controlled and cohort studies investigating symptom control and long term benefits of LCS. In 1975, Fyfe performed a randomised trial using phenol sympathectomy vs. local anaesthetic controls in patients with intermittent claudication but found no subjective or objective differences between the two groups at 1 and 3 months. In 1985, Cross performed a trial of LCS on 37 patients with critical limb ischemia, documenting relief of rest pain in 66% of patients in the treatment group and 23% in the control group at 6 months. In 1988, Norman and House showed that surgical lumbar sympathectomy in patients with claudication and rest pain avoided surgery in 67% of them after 5 years. In 1994, Baker and Lamerton published results of patients with severe PVD after lumbar sympathectomy which
showed resolution of rest pain in 86% within 6 months, and 64% recovered from trophic changes over a similar period. In 1995, Mashiah documented symptomatic relief in 48% of patients (n = 383) following chemical sympathectomy. In 2002, Matarazzo published results of more than 385 patients with peripheral vascular disease undergoing surgical sympathectomy. This trial showed improvement in symptoms (with regard to the improvement in pain, recovery of trophic lesions, objective and subjective rise in skin temperature) in 63% of patients after 1 year. Verma et al in 2007 showed significant improvement in pain and quality of life in patients with PVD, following LCS. Multiple single centre cohort studies have shown consistent symptom control in many patients with end stage PVD, and trials have shown that patient selection has played a major role.

8. Patient selection for lumbar sympathectomy

Patient selection for LCS has always been challenging. van Driel et al (1988) reported good results in 48% of patients with evidence of ulcer healing and pain improvement, and poor results in diabetics and in patients with an ankle brachial pressure index (ABPI) of less than 0.3. The TASC (Trans Atlantic Inter-Society Consensus) working group suggested that there was insufficient evidence to predict which patients would benefit from LCS, and recommended that patients with an ABPI of greater than 0.3 and with superficial tissue loss were the most likely to benefit from lumbar sympathectomy. Though some authors consider an ABPI of less than 0.3 as a negative predictor, the majority of surgeons have continued to use LCS in PVD as it often serves as a penultimate intervention prior to considering limb amputation. In fact, Lantsberg et al published results on a case series of patients undergoing LCS prior to below knee amputation showing improvement in below knee skin blood flow, which enhanced stump wound healing.

9. LCS – surgical preference?

Though lumbar sympathectomy has been popular since the early 1930s, multiple studies have failed to agree on set guidelines for patient selection and indications. In 2000, a survey of surgeons in Scotland showed 88% of surgeons practicing LCS. The authors concluded that the role of LCS would remain controversial because of the lack of a valid prognostic marker and technical variability, and this has continued to be so.

Our study has shown that the majority of respondents (75%) still believe that LCS has a role in current practice. Inoperable PVD with rest pain remain the common indications, although some institutions are using it for ulcer treatment, and a few to augment revascularisation. LCS is predominantly performed by anaesthetists and radiologists. The procedure is less commonly carried out by surgeons, and newly accredited vascular surgeons have had little exposure to this technique.

It is generally perceived that diabetic patients will have little response to sympathectomy, but 20% of our respondents said that they would still use it in such patients. Ninety percent of respondents used clinical improvement as the primary parameter for measuring outcome, with a rise in peripheral skin temperature indicating an immediate response. Of the 25% of respondents who do not believe that LCS has a role in PVD, most were of the opinion that LCS made no difference to symptom control and outcome.

10. Conclusion

Lumbar chemical sympathectomy is an inexpensive, minimally invasive and safe procedure. Our survey has shown that the majority of respondents to this questionnaire still believe that it has a place in the management of peripheral vascular disease of the lower limbs not amenable to surgical reconstruction. A randomised controlled study comparing conservative medical management vs. LCS in critical limb ischemia would be very useful in determining the place of LCS in the future management of end stage lower limb PVD, as there are currently no guidelines or solid studies which clearly demonstrate its efficacy.

Conflict of interest
None declared.

Funding
None declared.

Ethical approval
Not required.