30-day complication rates and patient-reported outcomes following day case primary lumbar microdiscectomy in a regional NHS spinal centre

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ABSTRACT

INTRODUCTION Advances in surgical and anaesthesia technique have reduced length of stay for lumbar discectomy. Current evidence suggests that daycase surgery is associated with improved patient satisfaction, faster recovery, reduced infection rates and financial savings. We present our microdiscectomy daycase protocol, together with 30-day postoperative complication rates and patient reported outcomes in an NHS setting.

METHODS AND METHODS We retrospectively studied all patients that met a locally agreed daycase protocol for lumbar microdiscectomy and were operated upon and discharged on the same calendar day between 1 March 2013 and 31 December 2015.

RESULTS A total of 134 patients underwent primary daycase microdiscectomy (70 males, 64 females). The cohort had a mean age of 41 years (range 16–82 years). Some 96% ($n = 129$) were single-level procedures, 93% were unilateral ($n = 125$) and 81% ($n = 109$) took place at either L4/L5 or L5/S1. All patients were discharged on the same day as admission and operation. Four patients re-presented to hospital within 30 days and three were discharged from the emergency department within four hours following a clinical review. One patient required an inpatient stay for a washout of a superficial postoperative infection. Significant improvements ($P < 0.05$) were found postoperatively for back pain and leg pain on self-reported visual analogue scores and Oswestry Disability Index.

CONCLUSION In this study, we present a safe and effective protocol for day case lumbar microdiscectomy. Our 30-day postoperative complication rate of under 1% is comparable to that of traditional inpatient primary lumbar microdiscectomy. Patient-reported outcome measures revealed significant improvement in both pain and functional scores.

KEYWORDS

Discectomy – Microdiscectomy – Daycase – Spine

Accepted 2 June 2018

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Introduction

Advances in surgery and anaesthesia have led to the evolution of many surgical procedures historically requiring an inpatient stay. The British Association of Day Surgery estimates that up to 80% of all surgery could be carried out on an outpatient basis, with inpatient stay chosen only by exclusion.¹ Daycase surgery brings with it many advantages in terms of patient satisfaction, faster recovery, reduced infection rates and substantial cost savings.²

The length of stay for patients undergoing surgery for lumbar disc herniation has been steadily declining since its introduction and has been described in previous literature as an outpatient procedure.³ It was first described as a daycase procedure in 1987 and has increasing evidence to support successful and safe outcomes.^{4–6} However, the UK has been slow to adopt daycase lumbar discectomy and the procedure is still associated with an overnight hospital stay in many institutions. This is despite evidence that suggests

outpatient lumbar discectomy can provide improved patient satisfaction,⁷ lower complication rates⁶ and lower costs. Current literature has suggested that a protocol-driven service can be delivered safely both with or without the use of an operating microscope.^{8,9}

We present a lumbar discectomy daycase protocol and the surgical outcomes following its implementation at a regional spinal centre with four orthopaedic spinal surgeons.

Materials and methods

Before daycase spinal surgery was initiated within our department, a lumbar discectomy daycase protocol was established. This was developed through collaboration between spinal surgeons, specialist nurses, physiotherapists and occupational therapists. This protocol considers patient specific factors, social factors and medical factors (Table 1). Patients listed for daycase procedures are placed early on

the theatre list and the physiotherapy team are made aware of the patients in the morning. They are assessed postoperatively by an extended scope physiotherapist with appropriate spinal training, who will complete an American Spinal Injuries Association chart prior to discharge and will escalate any concerns appropriately. Discharge criteria are outlined in Table 2.

In addition, patients on the daycase ward receive nurse-led discharge, provided that the surgeon has documented same-day discharge on the operation note. The daycase ward is not staffed overnight and typically closes at 7 pm. Any patients unfit to go home the same day or who have not fulfilled the daycase discharge criteria will have an inpatient bed made available on the orthopaedic ward.

All patients who underwent daycase primary lumbar discectomy between 1 March 2013 and 31 December 2015 were identified from a Bluespider database. Search terms were 'discectomy', 'decompression' and 'microdiscectomy'.

First and second level primary microdiscectomies were included. Operation notes were checked to ensure that the procedure was performed microscopically and that a standard technique was followed (Box 1).¹⁰

All identified patients were then cross-referenced with the hospital management system to ensure that they were admitted and discharged on the same calendar day. This resulted in 134 patients, who were then reviewed using electronic patient records to determine any complication within 30 days of discharge. The Oswestry Disability Index and visual analogue scores (VAS) were taken from data submitted to the British Spine Registry.

Results

A total of 134 patients underwent elective daycase primary lumbar microdiscectomy during the study period. Mean age was 41 years (range 16–82 years). Seventy patients

Table 1 Daycase lumbar discectomy protocol for listing patients.

Patient factors	Social factors	Medical factors
No limitation on age	Responsible adult available for at least 24 hours post-surgery and support must be available at home for one week post operatively	American Society of Anesthesiologists grade 1 or 2
Body mass index < 35	Travel home must be escorted in either a car or taxi	No previous adverse anaesthetic reaction
Able to consent to the procedure	Patients must have easy access to a toilet and telephone once home	Patients had to have their pain well controlled at preoperative assessment
Preoperative assessment and education from the spinal clinical nurse specialist	Live within one hour of hospital for any potential complications to be addressed quickly	Prior to discharge an American Spinal Injuries Association chart completed to assess for neurological complications. If satisfactory, then discharged with advice, analgesia and a contact number to call if problems arise
Preoperative assessment by occupational therapist and required equipment in place prior to surgery		

Table 2 Patient discharge criteria for day case lumbar discectomy.

Physiotherapy led	Nurse led	Follow-up
Full neurological examination completed with ASIA chart, concerns escalated.	National Early Warning Score less than 2	Patient happy to be discharged
Spinal physiotherapist to be happy with mobility, patient able to toilet and self-care.	Advice sheets given regarding red flag symptoms	Contact telephone numbers given in case of complications/concerns (Mon–Fri 9–5)
Exercises shown to patient and advice given regarding posture and mobilising	Analgesia to take home	Follow-up appointment at 3 months with either an extended-scope physiotherapist or clinical nurse specialist
	Wound check	
	Patient must have passed urine postoperatively	

Box 1 Surgical technique**Positioning and preparation:**

- > Intermittent calf compression stockings.
- > 1.5 g cefuroxime intravenously for prophylaxis (no routine postoperative antibiotics given).
- > A catheter is not used for daycase procedures.
- > Patient is placed prone on a Wilson frame, with the abdomen free.
- > Skin preparation with chlorhexidine.
- > Draping with disposable sterile drapes.

Five-point level check:

- > Clinic letter.
- > Consent form.
- > Skin marking.
- > Magnetic resonance imaging.
- > Intraoperative level check (a sterile spinal needle is placed on the contralateral side, in the paravertebral region at the clinical level. The correct level is confirmed using fluoroscopy control).

Procedure:

- > Skin incision 2–3 cm in the midline and dorsal lumbar fascia sharply split in line with incision.
- > Subperiosteal reflection of the paravertebral musculature is performed on the affected side.
- > The interlaminar space and ligamentum flavum are exposed.
- > Bleeding is controlled with bipolar forceps.
- > McCulloch retractors of the correct depth are placed taking care to insert the thin blade medially at the level of skin that was marked for the disc space.

The remainder of procedure is then conducted using a microscope.

- > A high-speed burr (5 mm diamond tipped) is used to resect the inferior edge of cephalad lamina and 2–3 mm of the medial edge of inferior facet.
- > The ligamentum flavum is released using a curette and Kerrison ronguers to expose the dural sac and lateral border of the nerve root.
- > Decompression of the dural sac and nerve root is performed, before the dural sac and nerve root are gently retracted medially and the annulus exposed.
- > Bipolar cautery used to cauterise any epidural veins over the disc herniation.
- > An annulotomy is performed with a size 11 scalpel blade as required to remove disc fragments.
- > The disc space is irrigated with a long angiographic catheter and pituitary forceps is used to free any loose disc fragments.
- > A thorough search for compressive disc pathology is made outside and inside the disc space.
- > The correct level of surgery is confirmed under fluoroscopy (images saved on to picture archiving and communication system).
- > No cerebrospinal fluid leak confirmed (Valsalva manoeuvre if thought necessary).
- > Epidural space infiltrated with 0.5% bupivacaine hydrochloride.

Closure:

- > Watertight closure in layers: No. 1 vicryl to fascia, 2.0 vicryl to fat and 3.0 monocryl to skin.
- > Skin glue.
- > Simple dressing applied.

(52%) were male. Follow-up was complete for 51 (38%) of the cohort at 6 months and 37 (28%) of the cohort at 12 months for self-reported VAS. Oswestry Disability Index was available for 47 (35%) of patients.

Surgery was undertaken at L3/4 ($n = 5$, 3%), L4/5 ($n = 57$, 43%), L5/S1 ($n = 66$, 49%). Six (4%) patients had surgery at more than one level. Most procedures (125; 97%) were unilateral.

All patients included in the study were discharged on the same calendar day. Four patients (3%) re-presented at the emergency department within 30 days of discharge, with only one requiring intervention as an inpatient. The

main reason for representation was issues with oozing from the wound, which was addressed in the emergency department with advice. The patient admitted back to the unit ultimately required a surgical washout, with a 14-day inpatient stay. This patient went on to make a full recovery and was subsequently discharged.

The self-reported VAS for leg and back pain were reduced postoperatively from a preoperative mean of 6.31 for back pain (range 0–10, $n = 93$) and 7.68 for worst leg pain (range 1–10, $n = 93$). At 12 months VAS had improved for both back pain and leg pain to a mean of 3.19 for back pain (range 0–8.1, $n = 36$) and 2.9 for worst leg pain (range

0–8, $n = 36$). The self-reported VAS were statistically and clinically significant for worst leg pain at 3, 6 and 12 months ($P < 0.01$; paired student's *t*-test; Fig 1).

The Oswestry Disability Index was reduced postoperatively from a preoperative mean of 49.7 (range 7–96, $n = 90$) to an average of 26.3 at 12 months (range 0–80, $n = 35$). These results showed both a statistically and clinically significant improvement ($P < 0.01$; paired student's *t*-test) at 3, 6 and 12 months. Average scores demonstrated that patients improved from severe disabling symptoms (40–60) to moderate disability (20–40; Fig 2).

Figure 1 Mean visual analogue score (VAS; with 95% confidence interval).

Figure 2 Mean Oswestry Disability Index score (ODI; with 95% confidence interval).

Discussion

Daycase lumbar surgery has been increasing in prevalence worldwide over the past 20 years and remains an under-used service in the UK. Current literature reports successful outcomes in both prospective and retrospective studies looking at safety, economic benefits and patient satisfaction.¹¹ The advantages of daycase surgery are well reported with reduced infection rates, high patient satisfaction and better mobilisation postoperatively.¹² Despite this, uptake has been slow and may be partly due to concerns about short-term complications such as haematoma or neurological complications. This study adds to the growing literature base looking at outcomes following daycase lumbar discectomy, with only 1.7% of patients in the series requiring a readmission following the procedure.

With current pressure to decrease costs within health care there needs to be a focus on cost-effective treatment. Current healthcare resource group tariffs at our trust put the cost of primary lumbar discectomy at £3,241,¹³ and the cost of length of stay is estimated to be approximately £315 per day for nursing and hotel costs.¹⁴ Given bed pressures currently prevalent in the NHS and a desire for efficiency savings, undertaking this procedure as a day case will allow more patients to undergo treatment at a lower cost and with fewer cancellations. In addition to the economic benefit of performing this procedure as a day case, our patient-reported outcomes demonstrate clinically significant improvements in visual analogue score, pain in the affected leg and decrease in overall disability as measured by the Oswestry Disability Index. Our results demonstrate that lumbar discectomy continues to benefit patients with radicular pain to 12 months after the procedure.

We recognise a limitation of this study is compliance with patient-reported outcome measures (PROMS) data at 6 and 12 months postoperatively; however, it is possible that patients who continue to return PROMS beyond six months are more likely to have ongoing symptoms. Consequently, we do not feel that this limitation is likely to cause a positive results bias. In the future, we plan to improve our PROMS follow-up rates by employing a dedicated PROMS data administrator.

Conclusion

This study shows that by using strict listing and discharge criteria, lumbar discectomy is safe to perform as a daycase procedure. In the future, by improved patient education methods with a greater emphasis on managing patients concerns and expectations, it may be possible to reduce the number of patients who re-present with pain, medication and wound problems. We strongly advocate adopting daycase lumbar discectomy in select patients.

Acknowledgements

The whole spinal team at Lancashire Teaching Hospitals NHS Foundation Trust, without whom this paper would not be possible.

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