

# Pain and Cosmesis following Four-Port Laparoscopic Cholecystectomy: The Patient View

<sup>1</sup>M Patel, <sup>2</sup>CP Neal, <sup>3</sup>AR Dennison, <sup>4</sup>MS Metcalfe, <sup>5</sup>G Garcea

## ABSTRACT

**Introduction:** The standard four-port laparoscopic cholecystectomy (SLC) is presently the gold standard in gallbladder surgery in the United Kingdom. The introduction of single port laparoscopic cholecystectomy (SiLC) is said to offer potential improvements in pain and cosmesis postoperatively. This study surveyed patient satisfaction at each of their port sites following uncomplicated four-port cholecystectomy.

**Materials and methods:** Retrospective postal questionnaire poll of 100 patients aged between 18 and 82. A ten-point visual analog score was used to assess postoperative pain at each respective port site within the first 72 hours. A similar scale was used to assess cosmetic satisfaction relating to scar color, stiffness, thickness and irregularity. Patients were asked whether or not they would prefer a single incision operation based on their experience of the standard four-port technique.

**Results:** Sixty-one patients returned their questionnaires (61% response rate). The median pain scores were highest at the umbilical port site the epigastric port site collectively had the worst cosmetic outcome in terms of satisfaction with scar color, stiffness, thickness and irregularity. 79.7% of patients were satisfied with the four-port procedure and only 20.3% would have preferred a single-port operation if given the option.

**Conclusion:** Patient satisfaction with standard four-port cholecystectomy is high. The umbilical port was consistently the most painful postoperatively, with cosmesis scores being worst for the epigastric port site. However, there is no firm data that would support SiLC over SLC based on this evidence.

**Keywords:** Cosmesis, Pain, Scar, Port site, Cholecystectomy.

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**Conflict of interest:** None

## INTRODUCTION

Over the last two decades, minimally invasive surgery has revolutionized the way in which symptomatic gallstones are

managed. The standard four-port laparoscopic cholecystectomy (SLC) is the current gold-standard of surgical treatment, and remains the primary technique employed for the 60,000 cholecystectomies performed annually within the United Kingdom.<sup>1</sup> In an attempt to reduce operative trauma and improve cosmetic results, there is a trend toward minimising the number of incisions with the use of single-port laparoscopic cholecystectomy (SiLC) and natural orifice transluminal endoscopic surgery (NOTES). Our aim was to investigate patient satisfaction with the standard four-port technique by assessing postoperative pain and cosmetic result scores as well overall satisfaction in an attempt to identify whether a single-incision technique would help us to provide a more acceptable patient experience.

## MATERIALS AND METHODS

### Study Protocol Open Access

The study consisted of a retrospective postal questionnaire poll of 100 patients aged between 18 and 82. Inclusion criteria included patients who had undergone an elective SLC (all performed by the same surgeon) within the last 6 months (from December 2011 to May 2012). Those who required conversion to open cholecystectomy were excluded from this study. Questionnaires were timed to be received at 2 months following surgery. A ten-point visual analog score (zero = no pain, ten = severe pain) was used to assess postoperative pain scores (within the first 24 hours) at the four respective port sites. A similar scale was used to assess cosmetic satisfaction relating to scar color, stiffness, thickness and irregularity (zero = like normal skin, ten = very different to normal skin). Patients were asked to report port site wound infections and overall satisfaction with their operation. More specifically, they were asked whether or not they would prefer a single incision operation based on their experience of the standard four-port technique.

### Operating Technique

A standard four-port technique utilizing 10 mm incisions at the umbilicus and epigastric region, with two lateral 5 mm retraction ports. The gallbladder was retrieved from the epigastric port site using a standard commercially available endoscopic retrieval bag. All port sites were infiltrated with local anesthetic postprocedure (Fig. 1).

<sup>1,2</sup>Specialist Trainee, <sup>3-5</sup>Consultant

<sup>1,2</sup>Department of General Surgery, University Hospitals of Leicester, Leicester, United Kingdom

<sup>3-5</sup>Department of Hepatobiliary and Pancreatic Surgery University Hospitals of Leicester, Leicester, United Kingdom

**Corresponding Author:** M Patel, Specialist Trainee, Department of General Surgery, University Hospitals of Leicester Leicester, LE5 4PW, United Kingdom, Phone: 0116 258 446 Fax: 0116 268 4708, e-mail: meerapatel@doctors.org.uk

## Statistical Method

Descriptive statistical analysis was undertaken on the data obtained using Microsoft Excel 2007 (Microsoft Corporation, USA).

## RESULTS

Sixty-one patients returned their questionnaires (61% response rate). The median pain score (higher score indicates worse pain) at the umbilical port was 3 (0-10), 1 (0-8) at the anterior axillary line port, 2 (0-9) at the midclavicular line port and 3 (1-10) at the epigastric port site. In response to which site was painful for the longest period of time following surgery: 42.4% of patients stated the umbilical port, 33.9% the epigastric port and 8.5% stated the anterior axillary line port (Fig. 2) (Table 1). The epigastric port site collectively had the worst cosmetic outcome in terms of satisfaction with scar color, stiffness, thickness and irregularity (median scores 4, 2, 2 and 1 respectively). Table 2 summarizes median cosmetic scores at the respective sites. The epigastric port site was the one and only site complicated by wound problems with 10.2% of study participants reporting infection at this site. 79.7% of patients were satisfied with the four-port procedure and only 20.3% would have considered a single-port operation based on their overall pain/cosmetic satisfaction.

## DISCUSSION

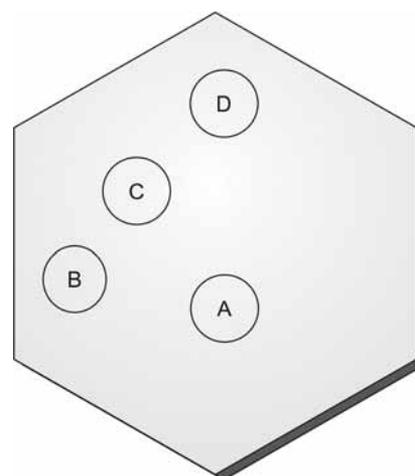
The SILC was first described by Navarra in 1997<sup>2</sup> and has since gained momentum, generating numerous studies (randomized, nonrandomized) and meta-analyses comparing the relative benefits of the single-incision technique over the SLC. Although not yet scientifically proven, advocates of SILC claim that improved cosmetic outcome is one of the main benefits over SLC as well as less postoperative pain, reduced wound complications and faster recovery.<sup>3,4</sup> In May 2010, the National Institute of Clinical Excellence (NICE) summarized the somewhat limited and largely inconclusive data regarding the safety and benefits of the SILC;

**Table 1:** Postoperative pain scores and port-site infection results

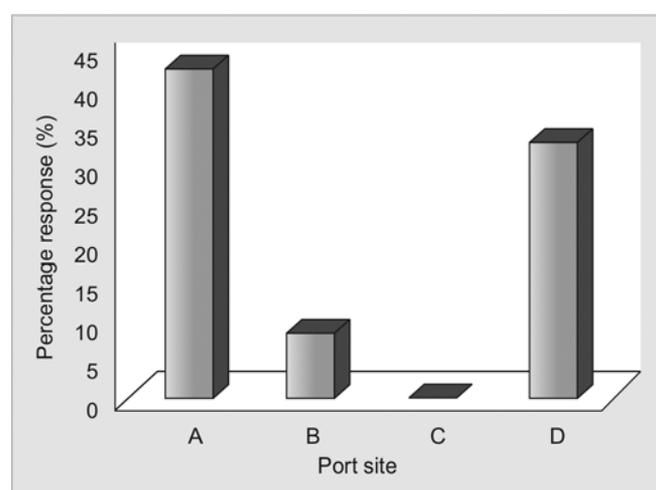
	A	B	C	D
Median pain score	3 (0-10)	1 (0-8)	2 (0-9)	3 (1-10)
Site painful for the longest period	42.4%	8.5%	0%	33.9%
Port-site infection	0%	0%	0%	10.2%

**Table 2:** Median cosmetic scores at each port site (0-10 scale)

Cosmetic feature	Port site			
	A	B	C	D
Color	3	2	1	4
Stiffness	1	1	1	2
Thickness	1	1	1	2
Irregularity	1	1	1	1



**Fig. 1:** Port site placement



**Fig. 2:** Responses to the question relating to which port site is painful for the longest postoperative period

stating publication of further evidence on the incidence of complications and comparison of outcomes of this procedure with the SLC is required. Few studies have reported on cost comparison between SILC and SLC. Bearing in mind the technical aspects of SILC are not standardized, there is statistically significant data to suggest the cost of SILC is higher than SLC with equivalent quality-of-life scores, pain analog scores, and pain-medication use.<sup>5</sup> In Hall et al<sup>6</sup> systematic review of studies, they reported similar or worse postoperative pain scores in 10 out of 13 articles comparing the SILC to the SLC.<sup>6</sup> Additional studies have confirmed there is no benefit conferred from the SILC within the 6, 8 or 24 hours postoperative period.<sup>4,7</sup> In this study, the umbilical port had the highest median pain score and was reported as the site painful for the longest period after the operation. A number of studies have highlighted the umbilical port site as the most problematic in terms of postoperative complications. Monkhouse et al<sup>8</sup> performed a retrospective wound review of patient who had undergone the SLC; 48% of patients had experienced a wound related issue (pain, infection) with 65% of these at the umbilicus.<sup>8</sup>

Median cosmetic scores were higher (i.e. worse score) at the epigastric port, closely followed by the umbilical port with 'color' as the feature scored as most unlike normal skin at both sites. Anecdotal evidence (also mentioned in a number of studies) would suggest the site of gallbladder retrieval is more likely to be complicated by postoperative wound infection and/or pain. The patients, in this study, underwent retrieval of the excised gallbladder via the epigastric port and this may account for the proportion of wound infections reported at this site and consequential poor cosmetic outcome. The main impetus behind the development of the SILC is a perceived benefit of superior cosmetic outcome. There are six studies investigating cosmesis after SILC, with three reporting a significantly improved cosmesis with this technique.<sup>6</sup> Interestingly, Bignell et al<sup>9</sup> assessed cosmetic outcome in women 4 years after SLC and concluded patients perceive cosmetic results after the procedure as excellent, with further anecdotal evidence suggesting the umbilical port as the site of problems for some patients.<sup>9</sup> We have confirmed the site of gallbladder retrieval will continue to cause problems with wound quality; importantly, the results demonstrated the umbilical port site can be problematic resulting in increased pain/suboptimal cosmetic result irrespective of this technicality.

Whilst the aim of this study is not to compare the SLC with the SILC, it is our aim to measure the quality of the services we provide and also to assess for the potential to provide a better surgical experience. The implementation of the Health and Social Care Act 2012 places the patient at the center of a new system. Patient experience, questionnaires/feedback and quality improvement will be central to hospitals securing services. We are aware of the influence patient factors, such as recall accuracy may have on retrospective pain ratings, however, studies have shown retrospective reports of pain intensity are consistent with those made while the pain was experienced.<sup>10</sup> Although we have not directly compared the SLC with the SILC, we have been unable to generate evidence from our experience with the SLC that would support the use of a single umbilical incision to replace the SLC; the problems which do exist have been demonstrated to be acceptable to patients across a number of studies and are those which are unlikely to be resolved by a single incision operation. It is possible, given our data, that SILC may offer a marginal benefit in cosmesis by avoiding an epigastric incision. However, it remains to be determined if the additional expense incurred by SILC would make this cost-effective.

## CONCLUSION

Patient questionnaires and feedback are central to assessing and improving the quality of the services we provide. Introducing SILC is unlikely to resolve the few issues which have been highlighted with the standard technique. Overall satisfaction with the conventional technique is high and this has been confirmed in a number of studies. Published data quantifying the cosmetic benefits of SILC over SLC is sparse and there is a lack of data from randomized studies validating any benefit. Robust evidence is required to demonstrate that SILC provides a cost-effective superior cosmetic/overall better outcome than the SLC. Ultimately, we have to raise the question: 'why fix it if it is not broken?'

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