

Assessment of pain by face scales after gastrectomy: comparison of laparoscopically assisted gastrectomy and open gastrectomy

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Abstract

Background Laparoscopic gastrectomy is reported to cause little pain. However, only the total number of analgesics used has been studied to date. Because pain is a subjective experience, its evaluation requires indicators for the subjective assessment.

Methods Pain was evaluation for patients after open distal gastrectomy (ODG, 52 cases), laparoscopically assisted distal gastrectomy (LADG, 112 cases), open total gastrectomy (OTG, 18 cases), and laparoscopically assisted total gastrectomy (LATG, 33 cases). The patients were administered continuous epidural anesthesia for 2 days after the surgery. The Wong-Baker FACES pain rating scale was used to evaluate the differences in pain. Each patient was evaluated from postoperative day (POD) 1 to POD 7, and temporal changes in pain were studied comparatively between ODG and LADG and between OTG and LATG.

Results Peak pain scores were recorded on POD 3 for both distal and total gastrectomy. The scores decreased over time after POD 3. There was no significant difference in scores between open and laparoscopic gastrectomy up to POD 2, but lower scores were shown on PODs 3, 4, and 5 for LADG and on days 3 and 4 for LATG.

Conclusions The pain score for laparoscopic gastrectomy was low. There was no significant difference in pain between procedures while epidural anesthesia was in effect. Pain subsided earlier with laparoscopic than with open gastrectomy. The same characteristics were observed with both LADG and LATG.

Keywords Face scale · Gastrectomy · Laparoscopy · Less invasive · Pain

The minimally invasive nature of laparoscopic gastrectomy (LG) has been reported in numerous studies [1–4]. Although laparoscopic surgery characteristically causes little postoperative pain, some patients report intense pain after LG, whereas others report almost no pain after open gastrectomy. A subjective analysis of pain is required because the criteria for the use of analgesics vary significantly due to individual differences. However, only studies on the total number of analgesics used have been conducted to date [1–3]. We therefore used the Wong-Baker FACES pain rating scale (Fig. 1) to evaluate the differences in pain between laparoscopic and open gastrectomy.

Materials and methods

The participants in this study were preoperative stage 1 gastric cancer patients who underwent distal or total gastrectomy between February 2005 and December 2007. The surgical procedures included 64 cases of open distal gastrectomy (ODG), 117 cases of laparoscopically assisted distal gastrectomy (LADG), 20 cases of open total gastrectomy (OTG), and 33 cases of laparoscopically assisted total gastrectomy (LATG).

The indication to use LG for gastric cancer in our hospital was preoperative clinical stage 1 disease, but the selection of procedure (open or laparoscopic surgery) depended on the patient's decision after the presentation of information for consent. To avoid the possibility of complications confounding the results, the evaluation of pain

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Fig. 1 The Wong-Baker FACES pain rating scale. Each face represents a person who feels happy because he has no pain or sad because he has some or a lot of pain. Face 0 is a very happy face because there is no pain at all. Face 1 shows just a little pain. Face 2 shows a little more pain, and face 3 shows even more pain. Face 4 shows a lot of pain, and face 5 shows as much pain as can be

imagined, although a person does not have to be crying to feel this bad. The patient is asked to choose the face that best describes how he or she is feeling. From Hockenberry MJ, Wilson D, Winkelstein ML (2005) Wong's essentials of pediatric nursing. 7th ed. Mosby, St. Louis, MO, p. 1259. Copyright 2005. Used with permission

using the FACES scale was conducted for patients who did not present with postoperative complications after ODG (52 cases), LADG (112 cases), OTG (18 cases), or LATG (33 cases).

Each patient was evaluated from postoperative day (POD) 1 to POD 7, and temporal changes in pain were compared between ODG and LADG and between OTG and LATG. The FACES scores were recorded three times per day by the patients, and the highest score of the day was used for analysis. The patients were given continuous epidural anesthesia for 2 days after surgery as well as diclofenac sodium or furbiprofen axetil if requested.

Both ODG and OTG were performed through a midline laparotomy incision approximately 20 cm long. The LADG procedure was performed using five ports (two 5-mm bilateral costal arch ports, two 12-mm bilateral flank ports, and one 12-mm camera port in the umbilical region) as well as a 4-cm upper midline abdominal incision to extract the stomach and create an anastomosis. For LATG, the port sites were the same as for LADG, except that the camera port wound was extended to 4 cm for stomach extraction, and reconstruction was performed laparoscopically.

The same postoperative care was provided for all the patients using the same clinical pathway. Walking was resumed on POD 2, and meals were resumed on POD 5. Gastric cancer and its treatment were described in accordance with the Japanese classification of gastric carcinoma (2nd English edn) by the Japanese Gastric Cancer Association [5].

Statistical analysis

Statistical analyses were performed using the *t*-test and chi-square test. A *p* value less than 0.05 was considered significant. Statistical analyses were performed using Dr SPSS II for Windows (SPSS Inc., Chicago, IL, USA).

Results

Operative findings

When performed laparoscopically, distal and total gastrectomy both required significantly longer operation time but resulted in significantly reduced blood loss and length of postoperative hospital stay. The incidence of postoperative complications was significantly lower with LADG than with ODG, but no significant difference was found between LATG and OTG (Table 1). The details of the postoperative complications observed in the laparoscopy groups are presented in Table 2.

Background of patients

The backgrounds of patients who did not have postoperative complications are presented in Table 3. There were no significant differences in sex, age, American Society of Anesthesiology (ASA) classification, or body mass index (BMI) between the ODG and LADG groups or between the OTG and LATG groups. The number of analgesics requested during the hospital stay was fewer for the patients in the laparoscopy groups, but a significant difference was found only between LADG and ODG and not between LATG and OTG.

Changes in pain scores after LADG and LATG

The mean FACES scores of each group were used to compare the changes in pain over time. Peak pain scores were recorded on POD 3 for both distal and total gastrectomy, and the scores decreased over time after POD 3 (Fig. 2A and B). There was no significant difference in scores between the ODG and LADG groups up to POD 2, but the LADG group showed significantly lower scores on PODs 3, 4, and 5 (Fig. 2A). Similarly, no significant

Table 1 Operative findings for laparoscopically assisted distal gastrectomy (LADG) and laparoscopically assisted total gastrectomy (LATG)

LADG			
	ODG (<i>n</i> = 66)	LADG (<i>n</i> = 117)	<i>p</i> value
Operation time (min)	249.3 ± 52.3	258.9 ± 63.8	0.310
Blood loss (ml)	223.7 ± 172.7	73.1 ± 90.7	0.000
Postoperative hospital stay (days)	21.1 ± 11.9	16.8 ± 7.1	0.003
Postoperative complications: <i>n</i> (%)			
+	12 (18.8)	5 (4.3)	0.003
−	52 (81.3)	112 (95.7)	
LATG			
	OTG (<i>n</i> = 20)	LATG (<i>n</i> = 33)	<i>p</i> value
Operation time (min)	274.8 ± 89.8	312.3 ± 56.4	0.067
Blood loss (ml)	335.3 ± 447.8	58.8 ± 49.8	0.0001
Postoperative hospital stay (days)	17.8 ± 5.5	16.0 ± 3.7	0.172
Postoperative complications: <i>n</i> (%)			
+	2 (20)	0 (0)	0.138
−	18 (80)	33 (100)	

ODG, open distal gastrectomy;
OTG, open total gastrectomy

Table 2 Breakdown of postoperative complications

	ODG (<i>n</i> = 64) <i>n</i> (%)	LADG (<i>n</i> = 117) <i>n</i> (%)	OTG (<i>n</i> = 20) <i>n</i> (%)	LATG (<i>n</i> = 33) <i>n</i> (%)
Anastomotic leakage	1 (1.6)	2 (1.7)	0	0
Pancreatic juice leakage	0	0	0	0
Postoperative bleeding	1 (1.6)	0	1 (5)	0
Anastomotic stenosis	3 (4.7)	2 (1.7)	1 (5)	0
Ileus	1 (1.6)	1 (0.9)	0	0
Peritonitis	1 (1.6)	0	0	0
Wound dehiscence	1 (1.6)	0	0	0
Infection of wound	3 (4.7)	0	0	0
Others	3 (4.7)	0	0	0
Total	12 (18.8) ^a	5 (4.3)	2 (10%)	0

^a Two cases overlapped

difference was observed between the OTG and LATG groups up to POD 2, but the LATG group showed significantly lower scores on PODs 3 and 4 (Fig. 2B).

Discussion

The general characteristics of LG are long operative time, little blood loss or pain, and short postoperative hospital stay [1–4, 6]. Postoperative vital signs and blood test results also are reported to be more stable after LG than after open gastrectomy [1, 4]. The incidence of complications after LG is equivalent to or lower than those after open gastrectomy, and the safety of the method also has

been established [1, 3, 4, 7, 8]. As such, LG currently is recognized as a minimally invasive surgery.

Although the findings of the current study generally were consistent with the literature, we believe that particularly with regard to patients' quality of life, the greatest benefit of LG is the reduced postoperative pain. However, some patients have reported intense pain after LG or have frequently requested analgesics. It has been difficult to evaluate the pain after LG in detail using basic comparisons of the number of analgesics used because pain is a subjective experience and varies greatly depending on the individual [1–3].

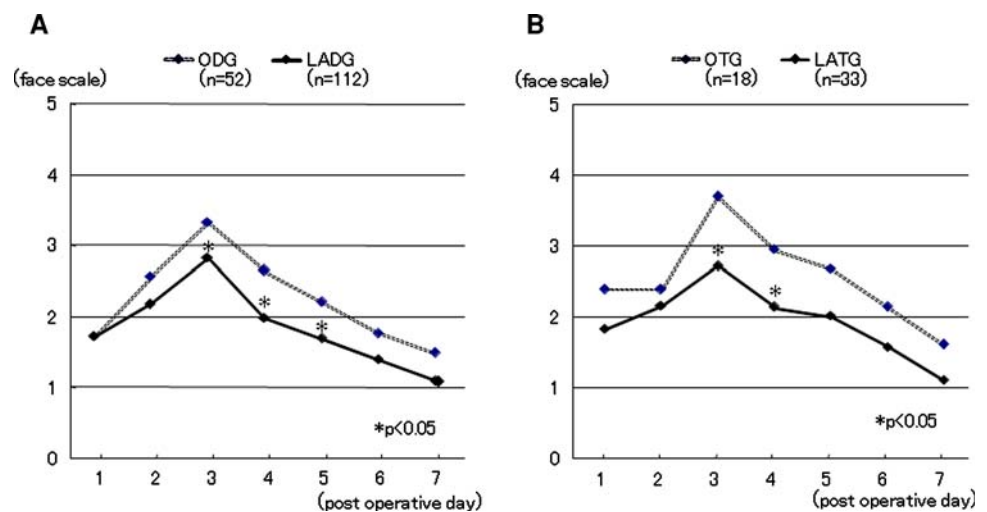
Evaluation of pain requires indicators for the subjective assessment of pain, and the visual analog scale is the most

Table 3 Background of patients with laparoscopically assisted distal gastrectomy (LADG) and laparoscopically assisted total gastrectomy (LATG)

LADG		ODG (n = 52)	LADG (n = 112)	p value
Gender	Male	36	76	1.000
	Female	16	36	
Age		65.0 ± 9.1	61.9 ± 11.1	0.078
ASA	1	17	42	0.524
	2	28	60	
	3	7	9	
BMI		23.1 ± 3.5	22.7 ± 2.9	0.45
Times of analgesic requirements		5.6 ± 5.1	4.0 ± 3.7	0.033
Min–max		(0–29)	(0–23)	
LATG		OTG (n = 18)	LATG (n = 33)	p value
Gender	Male	15	25	0.726
	Female	3	8	
Age		63.6 ± 11.1	63.2 ± 10.2	0.905
ASA	1	6	9	0.125
	2	8	23	
	3	3	1	
BMI		22.6 ± 3.7	23.0 ± 3.1	0.683
Times of analgesic requirements		7.1 ± 5.8	5.2 ± 6.5	0.309
Min–max		(1–24)	(0–37)	

ODG, open distal gastrectomy; OTG, open total gastrectomy; ASA, American Society of Anesthesiology; BMI, body mass index

Fig. 2 Changeover of face scale after laparoscopically assisted distal gastrectomy (LADG) (A) and laparoscopically assisted total gastrectomy (LATG) (B)



appropriate for this [9]. Several types of visual analog scales exist, but the current study used the Wong-Baker FACES pain rating scale, which is commonly used worldwide [10]. This visual analog scale, used originally to measure pain in children, currently is used to measure various types of pain in people of all races and ages.

Normally, postoperative pain is the most intense immediately after the operation and then decreases over time according to measurements using the FACES scale [11, 12]. In the current study, however, a different pattern of pain was observed due to the continuous epidural anesthesia given for 2 days immediately after surgery. The

pain peaked on POD 3 with all procedures and decreased thereafter. Although a precise evaluation of pain would require that no epidural anesthesia be used, it was considered impractical and ethically questionable to refrain from using epidural anesthesia for gastrectomy. This, however, enabled us to consider afresh the differences in pain between open and laparoscopic gastrectomy experienced by patients under epidural anesthesia.

In Fig. 2, which shows the temporal shifts in postoperative pain after open and laparoscopic gastrectomy, it appears that overall, the pain scores after LG are lower for both distal and total gastrectomy. However, a significant difference is shown only on PODs 3, 4, and 5 for LADG and on PODs 3 and 4 for LATG. We assumed that the difference was not significant on PODs 1 and 2 due to the use of epidural anesthesia for pain relief.

Starting from POD 3, a significant difference was found, suggesting that the characteristic of less pain with LG is due to pain subsiding at an early stage after surgery. It was also notable that identical characteristics were observed for two different procedures, LADG and LATG. This led us to hypothesize that these characteristics may be applicable to laparoscopic procedures in general [13, 14].

There is no question that LG causes less pain, but understanding the characteristics of pain after LG is important when the benefits of laparoscopic surgery are explained to patients. If patients experience intense postoperative pain when their understanding was simply that there would be less pain after LG, they may potentially feel anxiety and dissatisfaction.

The following conclusions on the comparative characteristics of pain between laparoscopic and open gastrectomy were drawn from the current study. There is no significant difference in pain while epidural anesthesia is in effect. Pain subsides earlier with LG than with open gastrectomy. The same characteristics are observed with both LADG and LATG.

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