Disadvantage of Operation Cost in Laparoscopy-Assisted Distal Gastrectomy under the National Health Insurance System in Japan

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Key Words

Laparoscopy-assisted distal gastrectomy • Gastric cancer • Health insurance • Minimally invasive surgery • Cost benefit

Abstract

Background: The utility and problems including the socioeconomic aspect of laparoscopy-assisted distal gastrectomy for gastric cancer have not been fully evaluated. **Subjects and Methods:** We compared open distal gastrectomy and laparoscopy-assisted distal gastrectomy for the clinical benefit, quality of life, and problems of operation cost by the reference documents in which the difference between open distal gastrectomy and laparoscopy-assisted distal gastrectomy was examined in detail. The reference documents retrieved by the key words 'gastric, cancer, laparoscopic, surgery' were 22 in PubMed with the following limits activated: Humans, Clinical Trial, Meta-Analysis, Randomized Controlled Trial, Review, English, Core clinical journals, published in the last 10 years. **Results:** The operation time of laparoscopy-assisted distal gastrectomy is longer than that of open distal gastrectomy. However, if skilled, the blood loss of laparoscopy-assisted distal gastrectomy is less, the hospitalization days and the duration of fasting after laparoscopy-assisted distal gastrectomy are shorter than those after open

distal gastrectomy. The number of excised lymph nodes and the incidence of postoperative complications were similar between laparoscopy-assisted distal gastrectomy and open distal gastrectomy. On the other hand, in the national health insurance system, the operation fee of open distal gastrectomy was USD 6,637 as compared to USD 7,586 for laparoscopy-assisted distal gastrectomy. In spite of the USD 949 difference in the operation fee, the use of disposable instruments for laparoscopy-assisted distal gastrectomy results in a deficit of USD 1,500 over open distal gastrectomy. **Conclusion:** In spite of the medical superiority of laparoscopy-assisted distal gastrectomy over open distal gastrectomy (if a skilled surgeon operates) as less invasive surgery, laparoscopy-assisted distal gastrectomy is associated with less financial benefit to the hospital as compared to open distal gastrectomy in the current Japanese health insurance system.

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Introduction

In Japan, health insurance is mandatory and covers virtually all residents of Japan to offer equally medical care. On the other hand, growth of national health care expenditure is a major problem with financial difficulty

and burden confronting the national government. Although most hospitals in Japan are nonprofit organizations, profit associated with the surgical procedure is an important issue.

Generally, if a skilled surgeon operates, the medical superiority of laparoscopy-assisted distal gastrectomy over open distal gastrectomy is admitted from a lot of reference documents. Recently, the minimally invasive surgery with laparoscopy for advanced gastric cancer has often been performed [1], and the Japanese social insurance system accepted the claim of Japanese surgeons and changed the cost of laparoscopy-assisted distal gastrectomy on April 1, 2006, 2008 and 2010. However, the cost of disposable instruments is only partly covered by national health insurance in Japan. In this study, we examined the utility and problems of the laparoscopy-assisted distal gastrectomy for gastric cancer with special emphasis on socioeconomic issue.

Subjects and Methods

We compared open distal gastrectomy and laparoscopy-assisted distal gastrectomy for the clinical benefit, quality of life, and problems of operation cost by the reference documents in which the difference between open distal gastrectomy and laparoscopy-assisted distal gastrectomy was examined in detail. The reference documents retrieved by the key words ‘gastric, cancer, laparoscopic, surgery’ were 22 in PubMed with the following limits activated: Humans, Clinical Trial, Meta-Analysis, Randomized Controlled Trial, Review, English, Core clinical journals, published between January 2000 and December 2009 [2–23]. Data regarding the following factors were considered about the clinical benefit and quality of life: operation time, blood loss, hospitalization days, duration of fasting after operation, number of excised lymph nodes, incidence of postoperative complication. The problems of operation cost were considered by simulating the material used for each operation, and calculating the operation fee under the national health insurance system in Japan.

Results

According to the reference documents retrieved in this study, the operation time of laparoscopy-assisted distal gastrectomy is longer than that of open distal gastrectomy. However, if performed by skillful surgeons, the blood loss of laparoscopy-assisted distal gastrectomy is less, and the hospitalization days as well as the duration of fasting after laparoscopy-assisted distal gastrectomy are shorter than with open distal gastrectomy. It is reported that the number of excised lymph nodes and the incidence of postoperative complication of laparoscopy-

Table 1. Clinical features of laparoscopy-assisted distal gastrectomy as compared with open distal gastrectomy (if performed by skillful surgeons)

Operation time	longer
Blood loss	less
Wound pain	less
Hospitalization days	shorter
Duration of fasting after operation	shorter
Number of excised lymph nodes	same
Incidence of postoperative complication	same

Table 2. Operation fee (USD) for distal partial gastrectomy for gastric cancer after April 2010

	Open	Laparoscopy-assisted
Operation fee (basic charge)	5,587	6,236
Additional fee		
Circular stapler	550 (× 1)	550 (× 1)
Linear stapler	250 (× 2)	250 (× 2)
Ultrasonic surgical knife, etc.	Needless	300
Total operation fee	6,637	7,586

assisted distal gastrectomy are the same as for open distal gastrectomy (table 1). There was the same tendency about the clinical profit and the disadvantage of laparoscopy-assisted distal gastrectomy in the reference documents retrieved in this study. On the other hand, the open distal gastrectomy operation fee (basic charge) of distal partial gastrectomy for gastric cancer is USD 5,587 and the laparoscopy-assisted distal gastrectomy fee is USD 6,236, and the additional fee for disposable instruments such as circular staplers (USD 550 × 1), linear staplers (open distal gastrectomy: USD 250 × 3, laparoscopy-assisted distal gastrectomy: USD 250 × 4), and USD 300 for the ultrasound scalpel items including LigaSure vessel sealing system became refundable from the insurance (in April 2008 for laparoscopy-assisted distal gastrectomy, in April 2010 for open distal gastrectomy). Therefore, the operation fee of open distal gastrectomy is USD 6,637, and that of laparoscopy-assisted distal gastrectomy is USD 7,586 (using 1 circular stapler and 2 linear staplers) (table 2). Many disposable operation equipments are required to perform laparoscopy-assisted distal gastrectomy (table 3). Therefore, the operation fee of laparoscopy-

Table 3. Disposable instruments required for open distal gastrectomy and laparoscopy-assisted distal gastrectomy: standard price (USD)

	Open	Laparoscopy-assisted
Company A		
GIA (instrument)	370	370
GIA (SULU)	280	280
DSTEEA	740	740
LAPDISC		200
BLUNTPORT		150
VERASTEP 12 mm		162 (× 2)
VERASTEP 5 mm		140 (× 2)
AutoSonix		480
LigaSure Atlas		820
Total cost	1,390	3,644
Company B		
Linear cutter	310	310
Linear cutter, reload	250	250
ILS (SDH)	570	570
MULTI-FLAPGATE		200
Blunt tip trocar		143
Bladeless trocar, 10/12 mm		155 (× 2)
Bladeless trocar, 5 mm		125 (× 2)
Harmonic scalpel		830
LigaSure atlas		820
Total cost	1,130	3,683

assisted distal gastrectomy is USD 949 higher than that of open distal gastrectomy, but the operation profit decrease is about USD 1,500 under the revised national health insurance system after April 1, 2010 in Japan (table 4).

Discussion

If used by skilled operators, laparoscopy-assisted distal gastrectomy is more useful than open distal gastrectomy as minimal wound surgery to make the hospitalization days short and to reduce the cost of medical care [24–35]. However, the cost of the disposable surgical instruments is not fully covered by health insurance in Japan. The hospital cannot charge medical treatment expenses exceeding the limit set by the national health insurance to the patient. Therefore, the hospital has to defray the operation cost exceeding the ceiling set by the national health insurance payment.

Table 4. Loss for the hospital per case of laparoscopy-assisted distal gastrectomy (USD)

	Open	Laparoscopy-assisted	Difference
Company A			
Total operation fee	6,637	7,586	
Disposable instruments price	1,390	3,644	
Economic burden to the hospital	5,247	3,942	1,305
Company B			
Total operation fee	6,637	7,586	
Disposable instruments price	1,130	3,683	
Economic burden to the hospital	5,507	3,903	1,604

The cost reduction measures when operating on laparoscopy-assisted distal gastrectomy under the national health insurance system in Japan include the use of cheap disposable or reusable instruments and avoidance of the use of LigaSure and disposable instruments as much as possible [36].

At present, the operation fee has been excluded in the inclusive payment on the new system called the Diagnosis Procedure Combination (DPC) [37] that begun in 2003 at 80 private and public university hospitals, a public cancer hospital, and a public cardiac care hospital. However, the hospitals have defrayed the cost of disposable operation equipment that exceeds the health insurance payment. From the socioeconomic point of view, the selection of surgical procedures should include considerations of the cost benefit and the net profit except instrument expenditure. Moreover, the surgeon should spend time and labor in the improvement of not only short-term quality of life such as minimally wound surgery, but also mid/long-term quality of life and survival rate.

In conclusion, laparoscopy-assisted distal gastrectomy is superior to open distal gastrectomy as a less-invasive surgery but is associated with decreased hospital profit. Laparoscopy-assisted distal gastrectomy may be expected to develop further outside the national health insurance system in Japan.

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