

## Laparoscopic Surgery for Endometrial Cancer : A Retrospective Study in a Non-academic General Hospital

KURIHARA, Shuichi

Department of obstetrics and gynecology, Japanese Red Cross Matsuyama Hospital

HIRAYAMA, Ami

Department of obstetrics and gynecology, Japanese Red Cross Matsuyama Hospital

NISHINO, Yui

Department of obstetrics and gynecology, Japanese Red Cross Matsuyama Hospital

TABUCHI, Keiko

Department of obstetrics and gynecology, Japanese Red Cross Matsuyama Hospital

他

<https://doi.org/10.15017/7153259>

---

出版情報 : 福岡醫學雑誌. 114 (2), pp.91-98, 2023-06-25. 福岡医学会  
バージョン :  
権利関係 :



---

## Original Article

---

# Laparoscopic Surgery for Endometrial Cancer : A Retrospective Study in a Non-academic General Hospital

Shuichi KURIHARA, Ami HIRAYAMA, Yui NISHINO, Keiko TABUCHI, Takashi Ikeda,  
Tatsuya KOMAMIZU, Shiho NAKANO, Hatsuko SEMURA, Atsushi TAKASUGI,  
Ayami SHINODA, Ryoko KAJIWARA and Naotoshi HONDA

*Department of obstetrics and gynecology, Japanese Red Cross Matsuyama Hospital,  
Ehime, Japan*

### Abstract

This study aimed to evaluate the feasibility and safety of laparoscopic surgery for endometrial cancer in a non-academic general hospital in Japan. A retrospective analysis was performed on clinical stage IA endometrial cancer patients with G1 or G2 endometrioid carcinoma on endometrial biopsy. Out of the 51 patients included in this study, 35 underwent laparoscopic surgery, while 16 had open surgery. Perioperative complications occurred in 3 patients (8.5%) in the laparoscopic surgery group and in 5 cases (31.2%) in the open surgery group. No serious adverse events were identified. Recurrence occurred in 2 patients who underwent laparoscopic surgery, but there was no statistically significant difference in relapse-free survival between the laparoscopic and open surgery groups. Our findings suggest that laparoscopic surgery for low-risk endometrial cancer can be safely performed not only in high-volume academic institutions but also in non-academic general hospitals in Japan.

**Key words** : endometrial cancer, laparoscopic surgery, minimally invasive surgery, hospital surgical volume

### Introduction

Total hysterectomy and bilateral salpingo-oophorectomy with surgical staging is the standard primary treatment for early-stage endometrial cancer cases<sup>1)</sup>. In recent years, minimally invasive surgery has become the preferred approach when it is technically feasible<sup>1)</sup>. Since Japan's health insurance system approved laparoscopic surgery for low-risk endometrial cancer patients in 2014, it has become widely adopted in Japan. According to the Japan Society of Obstetrics and Gynecology tumor registry database in 2020, patients who underwent minimally invasive surgery (MIS), such as laparoscopic or robot-assisted surgery, accounted for about 50% of cases with stage IA endometrial cancer<sup>2)</sup>.

Several retrospective studies have been conducted in a single Japanese institution on laparoscopic surgery for endometrial cancer, all of which reported the feasibility and safety of the minimally invasive surgical procedure<sup>3)–9)</sup>. However, as most of these investigations were conducted at high-volume academic hospitals, the feasibility and safety of laparoscopic surgery for endometrial cancer in non-high-volume, non-academic hospitals in Japan have not been clearly verified. Therefore, we retrospectively reviewed the cases of endometrial cancer treated by laparoscopic surgery in our institution, a non-academic general hospital, and assessed the surgical and oncological outcomes.

### Patients and Methods

We retrospectively reviewed electronic medic-

---

Corresponding author : Shuichi KURIHARA

Department of obstetrics and gynecology, Japanese Red Cross Matsuyama Hospital, 1 Bunkyo-cho, Matsuyama-city, Ehime 790-8524, Japan  
Tel : + 81-89-924-1111 E-mail : skuriha@gmail.com

al records and selected cases with endometrial cancer who underwent laparoscopic or open surgery for clinical stage IA lesions at our hospital between January 2015 and July 2022. Written informed consent was obtained from each patient. The study was approved by our institutional review board (reference number : 1003).

Clinical stages were determined by physical examination and imaging studies including both computed tomography and magnetic resonance imaging. Only cases with G1 or G2 endometrioid carcinoma on endometrial biopsy were included in this study, in accordance with the criteria for laparoscopic surgery required by Japan's health insurance system for patients with clinical stage IA endometrial cancer.

In most cases, laparoscopic surgery included total hysterectomy, bilateral salpingo-oophorectomy, and pelvic nodal dissection. In some cases of open surgery, additional para-aortic nodal biopsy was performed when intraoperative findings did not exclude the presence of enlarged para-aortic lymph nodes. Surgery was performed by gynecologic oncologists certified by the Japan Society of Gynecologic Oncology in all cases. For laparoscopic surgery, a board-certified laparoscopic surgeon was also present. To prevent peritoneal spillage of cancer cells during laparoscopic surgeries, we followed the standard methods, including suturing the cervix vaginally to close the external os, clipping and/or cauterizing the fallopian tubes at the beginning of the surgery, cleaning the vagina immediately before colpotomy, placing the resected uterus in a bag before transvaginal extraction, and avoiding the use of uterine manipulators.

We categorized surgery-related complications into three types : intraoperative complications ; early postoperative complications that occurred before hospital discharge ; late postoperative complications that occurred after hospital discharge. In the latter two categories, complications were graded according to the Japan Clinical Oncology Group criteria for postoperative

complications<sup>10)</sup>.

To compare differences between two groups, we used the Mann-Whitney U test and the chi-squared test. Relapse-free survival was calculated using the Kaplan-Meier method. All statistical analyses were performed using EZR, a graphical user interface for R developed by Saitama Medical Center, Jichi Medical University, Saitama, Japan<sup>11)</sup>.

## Results

Of the 51 patients included in this study, 35 underwent laparoscopic surgery and 16 had open surgery. Until 2018, patients were presented with unbiased information about both surgical approaches and could choose either one based on a consensus reached between patients and physicians. However, in 2019 we began recommending laparoscopic surgery for patients with endometrial cancer whose preoperative diagnosis met the requirements of Japan's health insurance system. Since then, 23 out of 29 patients (79.3%) with clinical stage IA endometrial cancer with low-grade histology underwent laparoscopic surgery. The remaining 6 patients were ineligible for laparoscopic surgery due to the following conditions : large tumor volume (in two cases), large uterus with myoma, difficulty in transvaginal removal of the uterus due to congenital disease, prior history of multiple open abdominal surgeries, and the need for prompt surgery due to comorbid cerebrovascular disease.

The clinical and pathological characteristics of the cases are presented in Table 1. Pelvic lymphadenectomy was performed in the majority of cases in both the laparoscopic surgery group (94.2%) and the open surgery group (93.7%). Additionally, para-aortic nodal biopsy was performed in six patients who underwent open surgery. In one patient who underwent laparoscopic surgery, the unilateral ovary was preserved at her request. Pathologic examination of the hysterectomy specimens confirmed low-grade (grade 1 or grade 2) endometrioid carcinoma in 50

**Table 1** Clinical characteristics

|                                  | Laparoscopic surgery (n=35) | Open surgery (n=16)     | P value |
|----------------------------------|-----------------------------|-------------------------|---------|
| Age (years), range               | 32–82 (median 56.0)         | 41–85 (median 56.5)     | 0.65    |
| BMI (kg/m <sup>2</sup> ), range  | 16.8–46.0 (median 26.4)     | 19.8–38.6 (median 27.0) | 0.87    |
| Pelvic lymphadenectomy, n        |                             |                         |         |
| Yes                              | 33 (94.2%)                  | 15 (93.7%)              | 1       |
| No                               | 2                           | 1                       |         |
| Final histological diagnosis, n  |                             |                         |         |
| Endometrioid, G1 or G2           | 35 (100%)                   | 15 (93.7%)              | 0.68    |
| Other histology                  | 0                           | 1                       |         |
| Pathological T and N, n          |                             |                         |         |
| pT1a, pN0                        | 31 (88.5%)                  | 14 (87.5%)              | 1       |
| pT1b, pN0                        | 2                           | 1                       |         |
| pT2, pN0                         | 1                           | 0                       |         |
| pT3a, pN0                        | 0                           | 1                       |         |
| pT1a, pN1                        | 1                           | 0                       |         |
| Adjuvant therapy, n              |                             |                         |         |
| None                             | 32 (91.4%)                  | 14 (87.5%)              | 1       |
| Chemotherapy                     | 3                           | 2                       |         |
| Follow-up period (months), range | 1–78 (median 34)            | 6–61 (median 45)        | 0.64    |
| Recurrence, n                    | 2 (5.7%)                    | 0                       | 0.84    |

**Table 2** Surgery-related outcomes

|   | Laparoscopic surgery (n=35) | Open surgery (n=16)  | P-value |
|---|-----------------------------|----------------------|---------|
| Estimated blood loss (ml), range                | 0–438 (median 50)           | 20–2586 (median 225) | 0.0003  |
| Cases with intraoperative complications, n      | 0                           | 1 (6.2%)             | 0.68    |
| blood transfusion, n                            | 0                           | 1                    |         |
| Cases with early postoperative complications, n | 1 (2.8%)                    | 1 (6.2%)             | 0.68    |
| Surgical site infection, n                      | 1 (G2)                      | 1 (G2)               |         |
| Cases with late postoperative complications, n  | 2 (5.7%)                    | 3 (18.7%)            | 0.34    |
| Lower extremity lymphedema, n                   | 2 (G1)                      | 2 (G1)               |         |
| Lower extremity lymphangitis, n                 | 0                           | 1 (G2)               |         |
| Infected pelvic lymphocele, n                   | 1 (G2)                      | 0                    |         |
| Abdominal incisional hernia, n                  | 0                           | 1 (G1)               |         |

of 51 cases. In one case, the final pathology revealed squamous cell carcinoma. Surgical staging identified stage IB carcinoma or a more advanced lesion in 6 patients (11.7%).

Surgical outcomes are shown in Table 2. None of the laparoscopic cases required conversion to laparotomy. Intraoperative injuries to the surrounding viscera were not identified. Two lapar-

oscopic cases and two patients in the open surgery group had one or more grade 2 postoperative complications. Grade 3 or higher complications did not occur. The incidence of adverse events related to surgery was not statistically different between the laparoscopic surgery group and the open surgery group, but the estimated amount of blood loss during surgery was greater

**Table 3** Summary of two patients with recurrence.

|                              | Case 1                                     | Case 2                            |
|------------------------------|--|-----------------------------------|
| Age (years)                  | 32   | 65                                |
| Primary surgery              | TLH + USO + US + PLND                      | TLH + BSO + PLND                  |
| Tumor size                   | 35 × 15mm                                  | 25 × 20mm                         |
| Histologic type/grade        | Endometrioid carcinoma, G2                 | Endometrioid carcinoma, G2        |
| Depth of myometrial invasion | 1mm (myometrial thickness : 29mm)          | 1mm (myometrial thickness : 10mm) |
| LVSI                         | Negative                                   | Negative                          |
| Peritoneal cytology          | Negative                                   | Negative                          |
| FIGO stage                   | IA   | IA                                |
| Detection of MSI             | Positive (MSI-H)                           | Negative                          |
| Adjuvant therapy             | None                                       | None                              |
| Time to first recurrence     | 11 months                                  | 30 months                         |
| Sites of recurrence          | Left ovary and/or pelvic lymph node, liver | Peritoneal cavity                 |
| Therapy for recurrence       | Chemotherapy (DC, AP), pembrolizumab       | Chemotherapy (TC)                 |
| Outcome*                     | Alive with disease (32 months)             | Alive with disease (14 months)    |

\* The number of months in parentheses indicates the length of time since the first relapse.

Abbreviations : AP, doxorubicin/cisplatin ; BSO, bilateral salpingo-oophorectomy ; DC, docetaxel/carboplatin ; LVSI, lymphovascular space invasion ; MSI, microsatellite instability ; PLND, pelvic lymph node dissection ; TC, paclitaxel/carboplatin ; TLH, total laparoscopic hysterectomy ; US, unilateral salpingectomy ; USO, unilateral salpingo-oophorectomy.

in the open surgery group.

Out of the 51 cases included in this study, cancer recurrence was identified in two cases, both of whom had undergone laparoscopic surgery. These two cases are summarized in Table 3. One patient (case 1), aged 32 years, underwent laparoscopic surgery, including hysterectomy, right salpingo-oophorectomy, left salpingectomy and pelvic lymphadenectomy. The left ovary, which showed no gross lesion, was preserved in line with her strong request. Pathologic examination revealed no extrauterine lesion, although surgical staging was incomplete, as described above. An intrapelvic tumor involving the left ovary and/or the pelvic lymph node and multiple liver metastases developed 11 months after the surgery. Another case (case 2) underwent laparoscopic surgery consisting of hysterectomy, bilateral salpingo-oophorectomy and pelvic lymphadenectomy as initial therapy. Peritoneal tumors developed 30 months later.

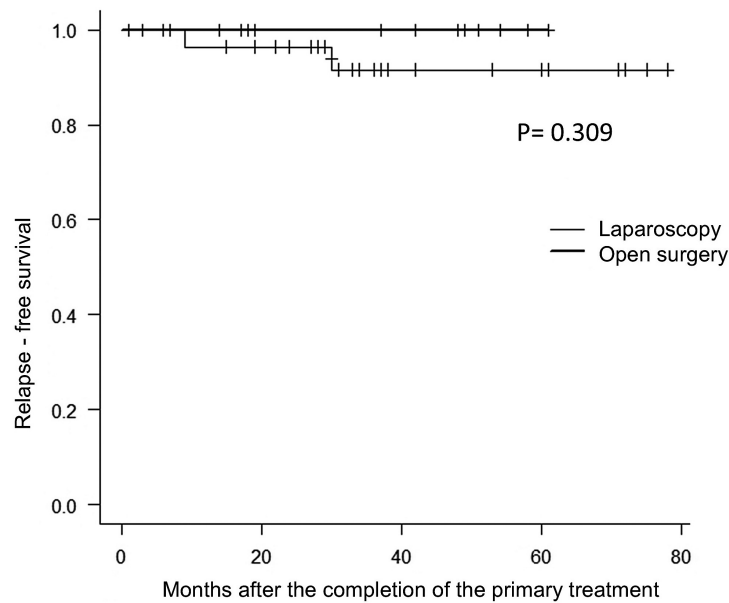
The rates of relapse-free survival in the laparoscopic surgery group and the open surgery

group were not statistically different (Fig. 1). No patient died of the disease during the follow-up period.

## Discussion

Our findings suggest that laparoscopic surgery for low-risk endometrial cancer is well-tolerated not only in high-volume academic institutions but also in general non-academic hospitals in Japan.

Of the 51 cases involved in this study, only one case (1.9%) had an upgraded histological diagnosis after postoperative pathological examination. This low percentage is consistent with similar retrospective studies conducted at high-volume academic institutions in Japan, where the rates of patients whose preoperative diagnosis of G1 or G2 endometrioid carcinoma was upgraded on final pathology ranged from 1.2% to 11.6%<sup>4)6)7)9)</sup>. Similarly, postoperative upstaging was detected in 6 patients (11.7%) in the current study, which is comparable to the rates reported in other studies (8.9% to 15.4%)<sup>4)6)7)9)</sup>. These results suggest that our preoperative assessment, includ-



**Fig. 1** Kaplan-Meier curves of relapse-free survival for each group (laparoscopy vs open surgery). The logrank test showed no statistically significant difference between the two groups.

ing imaging studies and histologic evaluations, was adequate and acceptable.

Out of the 35 patients who underwent laparoscopic surgery, three patients had four perioperative complications (overall complication rate of 11.4%). There were no serious adverse events. This morbidity profile does not differ largely from that reported in other Japanese studies conducted at high-volume academic institutions, where perioperative complication rates ranged from 2.4% to 15.9%<sup>4)6)7)9)</sup>. The safety of laparoscopic surgery including pelvic nodal dissection for endometrial cancer has been demonstrated in clinical trials<sup>12)13)</sup> and retrospective observations, including Japanese academic studies<sup>4)6)7)9)</sup>. Our results suggest that this safety can be replicated in non-academic general hospitals. This is consistent with the study by Wright et al., who reported that surgeon and hospital volume appear to have little effect on perioperative morbidity and mortality in women with endometrial cancer undergoing laparoscopic hysterectomy<sup>14)</sup>.

According to the investigation by Matsuzaki et al in 2021, no studies had examined the association between hospital surgical volume and oncologic

outcomes in minimally invasive surgery for gynecologic malignancies<sup>15)</sup>. In 2022, Machida et al. reported that treatment at high-volume centers was associated with survival benefits among women in Japan with the three types of gynecologic malignancies including endometrial, cervical and ovarian cancer<sup>16)</sup>. The study revealed a counterintuitive finding : women with stage I endometrial cancer in high-volume centers had significantly higher OS rates than those in low-volume centers. However, laparoscopic and open surgeries were not analyzed separately in the study. Thus, the volume-outcome relationship for oncologic outcome in endometrial cancer patients undergoing laparoscopic surgery remains understudied. In our study, relapse-free survival was not different between the laparoscopic and open surgery groups. No port-site metastasis specific to laparoscopic surgery was observed. Although the follow-up period was relatively short, the oncologic outcome was not compromised.

We recognize a number of limitations of our study. First, it is a retrospective study with a relatively small number of cases. Second, the

follow-up period was short ; the median follow-up period was 34 months in the laparoscopic surgery group. Third, because the study was conducted at a single institution, it is unknown whether the surgical and oncologic results obtained in this study are universally observed in other non-academic institutions. It is important to note that the oncologic outcome may be influenced by the eligibility criteria for minimally invasive surgery, which can vary between institutions. In our study, we only performed laparoscopic surgery on patients for whom en-bloc transvaginal removal of the uterus was clearly possible, and we avoided in-bag morcellation due to the risk of rupturing the plastic bag. As a result, laparoscopic surgery was not recommended for cases with large tumors. Given that a large tumor volume in endometrial cancer has been suggested as a possible risk factor for recurrence even in the early stages<sup>9)</sup>, it is possible that our selection criteria excluded high-risk patients from the laparoscopic surgery group, introducing a potential selection bias.

In conclusion, our results suggest that laparoscopic surgery for stage IA, low-grade endometrial cancer can be safely performed not only in high-volume academic institutions but also in non-academic Japanese general hospitals.

### Acknowledgements

We would like to thank Dr. Motofumi Yokoyama for his advice and guidance.

### References

- 1) National Comprehensive Cancer Network : Clinical practice guidelines in oncology. Uterine neoplasms (Version 1. 2023). [https://www.nccn.org/professionals/physician\\_gls/pdf/uterine.pdf](https://www.nccn.org/professionals/physician_gls/pdf/uterine.pdf).
- 2) The Committee on Gynecologic Oncology, the Japan Society of Obstetrics and Gynecology : The Annual Patient Report for 2020. *Acta Obstet Gynecol Jpn.* 74 : 2345-2402, 2022.
- 3) Terai Y, Tanaka T, Sasaki H, Kawaguchi H, Fujiwara S, Yoo S, Tanaka Y, Tsunetoh S, Kanemura M and Ohmichi M : Total laparoscopic modified radical hysterectomy with lymphadenectomy for endometrial cancer compared with laparotomy. *J Obstet Gynaecol Res.* 40 : 570-575, 2014.
- 4) Terao Y, Kitade M, Kusunoki S, Fujino K, Ujihira T, Kimura M, Kaneda H and Takeda S : Surgical and oncological outcome of laparoscopic surgery, compared to laparotomy, for Japanese patients with endometrial cancer. *Gynecol Minim Invasive Ther.* 5 : 64-68, 2016.
- 5) Kitagawa M, Katayama K, Furuno A, Okada Y, Yumori A, Sakakibara H, Shigeta H and Yoshida H : Safety of total laparoscopic modified radical hysterectomy with or without lymphadenectomy for endometrial cancer. *Gynecol Minim Invasive Ther.* 6 : 6-11, 2017.
- 6) Deura I, Shimada M, Azuma Y, Komatsu H, Nagira K, Sawada M and Harada T : Comparison of laparoscopic surgery and conventional laparotomy for surgical staging of patients with presumed low-risk endometrial cancer : The current state of Japan. *Taiwan J Obstet Gynecol.* 58 : 99-104, 2019.
- 7) Togami S, Kawamura T, Yanazume S, Kamio M and Kobayashi H : Comparison of survival outcomes between laparoscopic and open surgery in patients with low-risk endometrial cancer. *Jpn J Clin Oncol.* 50 : 1261-1264, 2020.
- 8) Tanaka T, Ueda S, Miyamoto S, Terada S, Konishi H, Kogata Y, Fujiwara S, Tanaka Y, Taniguchi K, Komura K and Ohmichi M : Oncologic outcomes for patients with endometrial cancer who received minimally invasive surgery : a retrospective observational study. *Int J Clin Oncol.* 25 : 1985-1994, 2020.
- 9) Chikazawa K, Netsu S, Imai K, Kimura A, Kuwata T and Konno R : Volume Index is a Risk Factor for Recurrence Even in Patients with Clinical Stage IA Endometrial Cancer Undergoing either Laparotomy or Laparoscopy : A Retrospective Study. *Gynecol Minim Invasive Ther.* 11 : 94-99, 2022.
- 10) Katayama H, Kurokawa Y, Nakamura K, Ito H, Kanemitsu Y, Masuda N, Tsubosa Y, Satoh T, Yokomizo A, Fukuda H and Sasako M : Extended Clavien-Dindo classification of surgical complications. Japan Clinical Oncology Group postoperative complications criteria. *Surg Today.* 46 : 668-685, 2016.
- 11) Kanda Y : Investigation of the freely available easy-to-use software 'EZ' for medical statistics. *Bone Marrow Transplant.* 48 : 452-458, 2013.



- 12) Walker JL, Piedmonte M, Spirtos N, Eisenkop S, Schlaerth JB, Mannel RS, Spiegel G, Barakat R, Pearl ML and Sharma SK : Laparoscopy compared with laparotomy for comprehensive surgical staging of uterine cancer : Gynecologic Oncology Group Study LAP2. *J Clin Oncol.* 27 : 5331–5336, 2009.
- 13) Zullo F, Palomba S, Falbo A, Russo T, Mociaro R, Tartaglia E, Tagliaferri P and Mastrantonio P : Laparoscopic surgery vs laparotomy for early stage endometrial cancer : long-term data of a randomized controlled trial. *Am J Obstet Gynecol.* 200 : e1–296. e9, 2009.
- 14) Wright JD, Hershman DL, Burke WM, Lu YS, Neugut AI, Lewin SN and Herzog TJ : Influence of surgical volume on outcome for laparoscopic hysterectomy for endometrial cancer. *Ann Surg Oncol.* 19 : 948–958, 2012.
- 15) Matsuzaki S, Klar M, Chang EJ, Matsuzaki S, Maeda M, Zhang RH, Roman LD and Matsuo K : Minimally invasive surgery and surgical volume-specific survival and perioperative outcome : Unmet need for evidence in gynecologic malignancy. *J Clin Med.* 10 : 4787, 2021.
- 16) Machida H, Matsuo K, Oba K, Aoki D, Enomoto T, Okamoto A, Katabuchi H, Nagase S, Mandai M, Yaegashi N, Yamagami W and Mikami M : Association between hospital treatment volume and survival of women with gynecologic malignancy in Japan : a JSOG tumor registry-based data extraction study. *J Gynecol Oncol.* 33 : e3, 2022.

(Received for publication January 12, 2023)



(和文抄録)

## 当院（一般的な総合病院）における子宮体癌に対する 腹腔鏡下手術の検討

松山赤十字病院 産婦人科

栗原 秀一, 平山 亜美, 西野 由衣, 田渕 景子, 池田 隆史, 駒水 達哉,  
中野 志保, 瀬村 肇子, 高杉 篤志, 信田 絢美, 梶原 涼子, 本田 直利

我が国では2014年に子宮体癌に対する腹腔鏡下手術が保険適応となった。一般的な総合病院での本術式の安全性、妥当性に関して評価をおこなうことを目的として本研究を実施した。術前の評価でIA期と推定され、術前の病理診断がG1あるいはG2の類内膜癌であった51例（腹腔鏡下手術：35例、開腹手術：16例）に関して後方視的検討を加えた。周術期合併症の発生率は腹腔鏡下手術で8.5%、開腹手術で31.2%であり、重篤な合併症はみられなかった。腹腔鏡下手術を施行した2例のみに再発がみられたが、開腹術施行群と比較し無再発生存率に有意な差はみられなかった。子宮体癌に対する腹腔鏡下手術は一般的な総合病院においても安全で妥当な術式であると思われる。

**キーワード：**子宮体癌，腹腔鏡下手術，低侵襲手術，医療施設別手術件数（Hospital surgical volume）