

ORIGINAL ARTICLE

The Endoscopic Surgical Skill Qualification System for gastric surgery in JapanN Tanigawa^{1,2,3}, SW Lee^{1,2}, T Kimura^{1,4}, T Mori^{1,5}, I Uyama^{1,6}, E Nomura^{1,2}, J Okuda^{1,2} & F Konishi^{1,7}

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Keywords

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Abstract*Introduction:* Laparoscopic surgery has been increasing in popularity in recent years. In 2004, the Japan Society for Endoscopic Surgery developed its Endoscopic Surgical Skill Qualification System (ESSQS) to assess surgeons.*Methods:* To earn the ESSQS accreditation, applicants must submit an unedited operative video in which they perform either a distal gastrectomy or pylorus-preserving gastrectomy with lymph node dissection for gastric cancer. The videos are assessed by two separate judges based on detailed criteria for common and procedure-specific technical-grade slips. Common criteria from all fields of gastrointestinal and general surgery are used to evaluate the basic laparoscopic surgical skills and autonomy of the operator. The target organ determines the procedure-specific criteria are set to assess whether or not adequate oncological clearance has been achieved.*Results:* Between 2004 and 2009, 154 (44.6%) out of 345 applicant surgeons assessed under the ESSQS for gastric surgery have been accredited. Interrater agreement was acceptable and ranged between 0.21 and 0.59.*Conclusion:* The ESSQS system may facilitate improvement in surgical technique and the standardization of laparoscopic surgery in Japan.**Introduction**

Laparoscopic surgery is increasingly popular as a less invasive alternative to conventional open surgery. However, there are drawbacks to the laparoscopic approach such as the lack of tactile feedback through long instruments and the 2-D display of the operative field. This means that laparoscopic surgery is technically more demanding than open surgery.

With the aim of improving laparoscopic technique, the Japan Society for Endoscopic Surgery (JSES) established the Committee for Endoscopic Surgical Skill Qualification System in 2001, which consists of members from various surgical specialties. Before the committee's establishment,

this type of skill accreditation by an academic body had not been done in Japan or elsewhere in the world. Here we describe the Endoscopic Surgical Skill Qualification System (ESSQS) for gastric surgery in Japan and present the results from our initial experience with accreditation through this process.

Materials and Methods**Organization**

The Committee for the Endoscopic Surgical Skill Qualification System consists of two members each from GI surgery, urological surgery, thoracic surgery, orthopedic surgery and pediatric surgery. The committee first

discussed the basic principles of the accreditation system in 2001 and reached an agreement on the following four points: an applicant must be a specialist in his or her field and have sufficient experience in endoscopic surgery; technical assessment would be based on an unedited video of the surgery being performed by the applicant; surgeons with sufficiently good technique would be accredited and may become instructors; and a review committee should be established in each field to evaluate applicants. The accreditation system in GI and general surgery started in 2004. For these fields, target organs are divided into stomach, thyroid, esophagus, colorectum, gall bladder, common bile duct, hernia, adrenal, spleen and breast.

Referee selection

In GI and general surgery, referees are organized into six groups according to their subspecialty: esophagus, biliary tract, stomach, colon, spleen and others. Judges are selected from a pool of active laparoscopic surgeons who had passed the accreditation examination more than 5 years previously, and their identities remain confidential.

Requirements for applicants

To be eligible for accreditation, applicants must meet the following requirements: (1) be a board certified surgeon, (2) have experience as the main operator or leader of the surgical team in laparoscopic gastrectomy for cancer in more than 20 patients, (3) have attended a minimum number of JSES scientific meetings, educational seminars or animal workshops, (4) have recommendations from two instructors, and (5) have made the minimum number of presentations at scientific meetings and authored a given number of published academic articles on endoscopic surgery.

Applicants must also submit a series of documents including a curriculum vitae, a log of surgeries performed, and recommendation letters. The unedited video that applicants must provide should be accompanied by some background information about the case such as the patient's age, height, body weight, clinical stage, past history, operative time, bleeding volume, intraoperative and postoperative complications, hospital stay and any comments on the surgical procedure. If the submitted video does not include suturing and knot-tying procedures, a separate video demonstrating these techniques is required for evaluation. For gastric surgery, the type of resection is limited to either distal gastrectomy or pylorus-preserving gastrectomy with lymph node dissection for gastric cancer. Hand-assisted laparoscopic procedures are not evaluated in the current qualification system.

Grade guidelines

Two types of grade criteria are used for assessment: common and procedure-specific grade slips. The common criteria are designed with the intention to evaluate set-up, autonomy of the operator, recognition of surgical anatomy and basic laparoscopic skills during the procedure (Table 1). These criteria are not intended to evaluate the manual dexterity of applicants. Laparoscopic suturing and knot-tying are assessed for two-hand coordination. Applicants are graded on a 100-point scale, with 60 allotted for the common criteria and 40 points for the procedure-specific criteria. The procedure-specific criteria for distal gastrectomy with lymph node dissection are designed to assess the oncologic clearance in a step-by-step fashion (Table 2). The criteria are revised occasionally to improve accuracy and reproducibility of the system.

Accreditation process

Surgeon evaluations are performed by two referees who are anonymously assigned to the applicant. The pass mark for qualification has been set at 70 points. In cases where the results of the two referees are the same, the decision is made accordingly. When the results of two referees are different, the video is assessed by a third referee. If applicants fail the accreditation process, referees are required to provide constructive feedback on any inappropriate or dangerous maneuvers.

Results

Qualification rate

From 2004 to 2009, out of the 345 applicants who entered the qualification system for gastric surgery, 154 were

Table 1 Common criteria

Category I: Progress of the operation	
I-1 Speed of the operation	4 points
I-2 Autonomy of the operator	4 points
I-3 Leadership ability	4 points
I-4 Cooperation with assistants	4 points
Category II: Exposure of the operative field	
II-1 Insertion of ports	3 points
II-2 Keeping the surgical field in the center	3 points
II-3 Display of the target organ	3 points
II-4 Tissue retraction (use of the retractor)	3 points
II-5 Use of the non-dominant hand	3 points
Category III: Basic laparoscopic surgical skills	
III-1 Proper selection of equipment	3 points
III-2 Proper handling of tissues	3 points
III-3 Proper use of energy devices	3 points
III-4 Correct dissection plane	5 points
III-5 Control of vessels	5 points
Category IV: Suturing and knot-tying	
IV-1 Suturing skills	5 points
IV-2 Knot-tying skills	5 points

accredited, a qualification rate of 44.6% (Figure 1). Interestingly, qualification rates in other fields of GI and general surgery tend to plateau at a similar level, between 37.1% and 56.8% (1).

Interrater agreement

In 2004, the interrater agreement was 0.37. Interrater agreement improved to 0.59 in 2005. Thereafter, agree-

ment was still acceptable at 0.34, 0.28, 0.21 and 0.28 for the respective years between 2006 and 2009 (Figure 1).

Discussion

Surgical skills assessments have been developed as a reliable and reproducible tool to evaluate surgical technique and also facilitate structured operative training in laparoscopic surgery. Similar to the JSES, other organizations and institutions have created surgical skills assessments utilizing videos of applicants performing surgery and on the operating table (2–6). High interrater agreement and reproducibility have been demonstrated in these reports, though trainers assessed residents and younger surgeons.

The system reported here has been designed to evaluate the skills of practicing surgeons rather than trainees. Because of laparoscopic surgery's higher technical demands and relatively recent popularization, a robust system for the assessment and standardization of the laparoscopic technique is in demand, especially as there may be a wide range of technical expertise among practicing surgeons. The viewing of unedited videos by two referees allows for the unbiased assessment of both surgical skill and perioperative conduct, particularly in relation to dangerous maneuvers that could lead to complications. Moreover, the assessment allows for the overall performance of the surgical team and leadership of the primary surgeon to be evaluated. The present ESSQS grading system subtracts points for every dangerous or insufficient maneuver, and the number of points deducted depends on the extent of the mistake. The applicant is given feedback to explain the deduction of points and to offer advice on future improvement in surgical conduct.

Table 2 Organ-specific criteria

Two points are allotted for each of the following items:

1. Were the ports positioned appropriately?
2. Was the operating field secured (e.g. by appropriately excluding the liver)?
3. Were the grasping forceps been appropriately, to prevent injury to the stomach and adjacent organs?
4. Was there any bleeding caused by the inappropriate use of grasping forceps or an energy device?
5. Was the gastrocolic ligament divided appropriately?
6. Were any measures taken to prevent injury to the large intestine?
7. Were the No. 6 lymph nodes dissected appropriately?
8. Was the right gastroepiploic artery transected appropriately?
9. Were the No. 5 lymph nodes dissected appropriately?
10. Was the left gastric vein transected appropriately?
11. Were the No. 7 lymph nodes dissected appropriately?
12. Were any measures taken to prevent injury to the pancreas?
13. Were the No. 1 lymph nodes dissected appropriately?
14. Were the No. 3 lymph nodes dissected appropriately?
15. Was the extent of lymph node dissection sufficient?
16. Was an oncologic resection performed?
17. Was a reliable reconstruction performed?
18. Was the blood flow to the anastomosis adequate?
19. Was there any excessive tension on the anastomosis?
20. Did the completed anastomosis have a good shape?

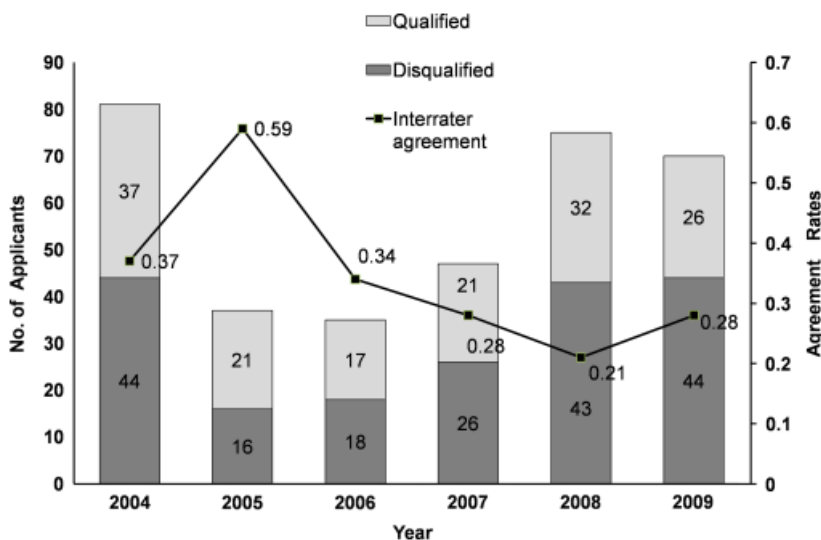


Figure 1 Qualification through endoscopic surgical skill assessment and interrater agreement in gastric surgery between 2004 and 2009.

To investigate the clinical relevance of the ESSQS accreditation system, Mori *et al.* and Kimura *et al.* studied surgical complications and interrater agreement on candidates who have gone through the system (1,7). Patients of candidates who passed have significantly fewer surgical complications than patients of those who failed. The results display sufficient ability to stratify the risk of complications from these procedures. However, interrater agreement was not very high, and the reliability of the assessment has been questioned. A better interrater agreement is essential for this system to work, and this can be achieved by holding consensus meetings and improving the judgment criteria. In order to have clinical relevance and educational importance for practicing surgeons, our qualification system should be continually revised and the results must be reproducible.

The endoscopic surgery accreditation system in Japan is the first surgical skills assessment tool of its kind to be implemented. It assesses laparoscopic surgical skills through the evaluation of operative video recordings. Although there is still room for improvement and, at present, this accreditation system does not affect a surgeon's ability to practice, this project has already stimulated educational debate in seminars around Japan, which will likely continue and grow.

In conclusion, the surgical skills assessment system described here is likely to contribute to the standardiza-

tion of laparoscopic technique and enhance surgical skills of endoscopic surgeons in Japan.

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