

Clinical Science

Development and validation of a checklist for assessing recorded performance of laparoscopic inguinal hernia repair



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Abstract

BACKGROUND: Despite a need for video assessment for the performance transabdominal preperitoneal procedure (TAPP), the present assessment tools have not been validated for the use of evaluation of the recorded performance. We aimed to develop a checklist for the evaluation of the recorded performance of TAPP.

METHODS: The TAPP checklist was developed by hernia experts from multiple institutes. Thirty unedited TAPP videos were rated by 3-blinded hernia experts. Inter-rater reliability and construct and concurrent validities were evaluated.

RESULTS: The inter-rater reliability for 3 raters was .75 (95% confidence interval .60 to .86). The median total score of each group demonstrated a significant difference among experienced (>50 TAPP), intermediate (≥10 TAPP, <50), and novice (<10 TAPP) surgeons ($P < .001$). The checklist score showed a high correlation with TAPP experience and previously validated global scale for laparoscopic inguinal hernia repair.

CONCLUSIONS: The TAPP checklist is a valid metrics for the assessment of the recorded TAPP performance.

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Since its very first use in the clinical setting in 1992, laparoscopic inguinal hernia repair (LIHR) is slowly gaining popularity.^{1,2} Studies have shown improved clinical outcome with LIHR compared with open hernia repair.^{3,4} However, even in North America or many countries in Europe open hernia repair is still performed in majority of the cases.^{1,2,5} Although the lack of consensus among the surgeons about the benefit of LIHR seems to be the main reason behind this,⁵ technical difficulty of the procedure is another factor limiting the growth of LIHR.^{3,4}

Of the 2 major techniques of LIHR, there are more cases of totally extraperitoneal repair reported in the literature. However, a recent survey reported 52% of surgeons preferring transabdominal preperitoneal procedure (TAPP).⁶ Although previous meta-analysis has not been able to show superiority of one technique over another in regards to the clinical outcomes,⁷ totally extraperitoneal repair is often considered to be more difficult technique of the two with relatively longer operation time and potentially longer learning curve.^{3,4}

One of the main advantages that TAPP procedure offers is the better view of anatomic landmarks and inguinal anatomy.⁸ These features make TAPP an easier procedure to start with for the surgeons in centers, which are willing to introduce LIHR into their practice. However, higher risk of complications have been reported during the learning curve and in the cases performed in small volume centers without experienced LIHR surgeons.⁴ Even for the experienced practicing surgeons, Birkmeyer et al⁹ have demonstrated that the technical skills varied widely and this was reflected as postoperative morbidity. Though the study focused on bariatric surgery, similar situation can be expected for the other fields. For the reduction of surgical complications and to provide safe surgery to general public, there is the necessity for an assessment system, which can assess the surgical performance of a surgeon and provide them with focused formative feedback from experts.

Recently, studies have shown the possibility of using recorded performances to evaluate the surgical performance.^{10,11} Several procedure-specific assessment tools to assess LIHR performance in clinical setting have been developed in the past such as Global Operative Assessment of Laparoscopic Skills–Groin Hernia (GOALS-GH) and operative performance rating system.^{12,13} The intended use of these instruments are for direct observations and are yet to be proved to be an effective metrics for the evaluation of recorded TAPP performance.^{12,13} Moreover, these tools by its nature, cover only the major steps of the procedure and does not go into the detail on each aspect, limiting the feedback it can provide to the trainees. For this, there is a need for more detailed evaluation tool based on the steps of the TAPP procedure which could provide the detailed feedback and also act as an anchor for the trainees to understand the procedure better.

The objective of the present study was to develop a novel assessment tool for performance of TAPP procedure

and to collect validity evidence for use as a metrics of recorded performance.

Methods

Development of the TAPP assessment tool

An experienced TAPP surgeon, with experience of more than 300 TAPP procedures conducted the task analysis of the TAPP procedure existing textbooks, expert videos, and his experience to extract the important steps of the TAPP procedure and details of what was needed to be done in each step. The initial list was developed using iterative methodology based on semistructured interviews and group discussions of the experienced TAPP surgeons, a surgeon educator with the experience in the development of operative performance assessment tool. Three-experienced TAPP surgeons, with experience of more than 100 TAPP cases each, 1 open hernia expert (>4,000 cases), 1 surgeon educator (developer of GOALS-GH) were individually contacted with this preliminary list for their opinion. Open hernia expert was added to the panel for his knowledge of hernia anatomy based on the sheer volume of the cases he had experienced. The surgeon educator was added to the panel based on his experience with the development of assessment tool and knowledge of TAPP procedure.

The list was modified based on their opinion. This process was repeated multiple times until the consensus was reached among all 5 members of the panel. The final list consisted of 24 steps of TAPP forming the TAPP checklist (Fig. 1.). Each item in the checklist was given the score based on the requirement stated in the definition, with score of 1 if it was deemed adequate and 0 if it was deemed inadequate. The total score is the sum of score of all the items in the checklist with maximum score of 24. For the statistical analysis, higher score were considered as better performance. However, there are multiple ways to obtain the same score. For the clinical and training purposes, all the items were not considered to be equal, and the trainees were asked to concentrate on the items they did not score rather than to be happy with the total score.

Because of our effort to fit the checklist in one sheet of article, we have limited the explanation section to only main keywords which would help guide the raters and trainees. A separate detailed explanation sheet was prepared especially for the trainees to help them understand what was required in each step. Since the checklist was created by Japanese surgeons, local practice in Japan has been reflected. Although we did consult international guidelines and textbooks, the experts also considered if we could adapt those in context on Japan. For example, international guidelines recommend the mesh size of $15 \times 10 \text{ cm}^2$; however, for most of the Japanese experts agree that for average Japanese patients, who on average are smaller than European and North American counterpart, a mesh size of $13 \times 9 \text{ cm}^2$ adequately covers the

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