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Mastering minimally invasive esophagectomy requires a mentor; experience of a personal mentorship

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HIGHLIGHTS

- Not all residency programs include a teaching program with the guidance of dedicated mentors.
- Teaching minimally invasive surgery requires a mentor.
- A dedicated team should be set up for learning new minimally invasive techniques.

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ABSTRACT

Since the first laparoscopic procedure, there has been an steady increase in advanced minimally invasive surgery. These procedures include oncological colorectal, hepatobiliary and upper gastrointestinal surgery. Implementation of these procedures requires different and new skills for the surgeons who wish to perform these procedures. To accomplish this surgical teaching program, a mentorship seems the most ideal method to teach the apprentice surgeon these specific skills.

At the VU medical center a teaching program for a minimally-invasive esophagectomy for esophageal cancer started in 2009. At first it started in different centers in the Netherlands and later on we also started mentoring other institutes throughout Europe, Latin America and India.

In this article we describe our experience and the outcomes of this mentorship in advanced minimally invasive surgery.

1. Introduction

New teaching programs in Minimally Invasive Surgery (MIS) require mentoring and training [1]. We see that, once a new MIS procedure has been validated, many surgical teams want to adopt the new procedure. The issue is how this is best learned, according to best standards of practice. Commonly, the teaching programs in MIS may range from the institutionalized programs involved in the residency program to the quick one-or-two-day courses organized by surgical departments or companies targeting (young) surgeons desirous but still unable to operate by the new MIS approaches. While these opportunities offer interesting displays of new MIS, effective teaching programs in MIS developments are yet very variable and ad hoc.

Because of years of experience in teaching MIS, we argue that learning new procedures could profit from proper assistance by an experienced team or particularly a mentor. Given our experience as a teaching mentor, we believe that MIS of technically demanding skills such as gastrectomy or esophagectomy is best mastered by the apprentice surgeons participating in the entire procedure. Thus involving the whole team, including anesthesiologists and operating room nurses, and thereby being assisted in carrying out procedures by the same mentor in one's own hospital. Hence, in this paper a program of teaching Minimally Invasive Esophagectomy (MIE) by thoracoscopy and laparoscopy is evaluated, where mentoring has been practiced.

2. Historical background

At the VU medical center, we started the MIE program in 1998 by using the laparoscopic transhiatal approach for distal and gastro-esophageal junction cancers (GEJ) [2,3]. Aiming for better radicality with an adequate lymphadenectomy, we started with the thoracoscopic approach in lateral position in 2006 [4]. After a

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limited number of cases, and after watching the prone position approach live in a surgical congress, we switched to the right thoracoscopy in prone position. In 2007, we performed the first intervention assisted by a thoracic surgeon who was already performing video assisted thoracic surgery for lung cancer.

After five three-stage MIE in prone position, without any conversion and only one postoperative respiratory infection, we felt that we could properly perform MIE through this approach. Consequentially, we continued operating all patients through this approach, with the exception of patients included in the CROSS trial (neoadjuvant chemoradiotherapy plus surgery versus surgery alone for esophageal or junctional cancer) [5]. The department's participation in the CROSS trial meant that all patients in this trial were approached by an open procedure. By 2009 we had operated 80 patients and considered ourselves experienced enough with this approach to engage evaluation . Our search for evidence led to a randomized controlled trial, the TIME trial, where we compared the total open procedure by thoracotomy and laparotomy with the total MIE by right thoracoscopy and laparoscopy after neoadjuvant chemo radiotherapy according to the CROSS scheme [6]. Since 2009 we instituted the teaching program of MIE, at first doing so in the Netherlands and later elsewhere.

3. Material and methods

Since 2009, we have taught the MIE approach in our own department, to 4 young fellows, and in 20 centers located in Europe, Latin America and India. In our hospital surgeons and fellows could participate in the teaching program, no residents were included in the program. The fellow was always under supervision of another surgeon. In the other participating hospitals only surgeons could participate. From the beginning our teaching strategy differentiated between teaching situations; namely a) centers already using MIE and harboring initial experience, and b) centers with no experience in MIE but having enough volume of patients.

Using this approach, we served centers in the Netherlands [9], Sweden [1], Spain [5], Brazil [1], Switzerland [1], Greece [1] and India [2]. Of these, 12 centers had no previous MIE experience. The other eight centers already had some experience with the MIE, but wanted to gain competences in the prone thoracoscopy or aimed, by means of proctoring and a master class, to gain the required proficiencies.

Criteria for teaching at a center involved is having a sufficient volume of patients with esophageal cancer, at least 20 cases per year, and having at least two surgeons who were dedicated, totally or partially, to upper gastrointestinal surgery (upper GI).

We also adapted the teaching policy to ask the whole team of the centers with no previous experience to visit our center in Amsterdam for watching at least two whole procedures performed at the operating room. A whole team would include two surgeons, an anesthesiologist involved with the procedure and one or two scrub nurses. After some weeks, the mentor assisted the surgeons to be proctored in a variable number of procedures where the initial intention was doing five. In our hospital, half of the surgeries were used for the teaching program.

Regarding the centers with some experience with MIE, a visit was arranged to operate together with the corresponding team, and involving one or more procedures as a master class training.

Our protocol included that each to-be-treated patient was discussed beforehand and accepted as a good candidate for the operation. In the beginning stage I and II patients with esophageal cancer were chosen, later on no selection was made after proper response to neoadjuvant therapy. All patients had given informed consent; the mentor had been introduced to(the patient or the apprentice surgeon?) and had spoken with them before the operation. Moreover, insurance items were arranged properly.

With regards to complications, postoperative complications were recorded at the participating hospital. Perioperative complications included bleeding, trancheo-bronchial lesion or lesion of the tumor. Postoperative complications included chyle leak, anastomotic leak and recurrent nerve palsy. Daily contact with the surgeons was maintained during the treatment of the patient.

Reimbursement for the mentor was usually arranged for travel, hotel if necessary, and payment for each operation, in some cases through the intervention of a commercial company.

Moreover, other items such as the way to do the cervical anastomosis, the use of a fast track program after MIE, and the treatment of major postoperative complications were broadly discussed.

Considering the prominent role of mentoring in our teaching strategy, we are interested in knowing whether the proctored centers had continued with the MIE programs and what significance the mentoring had for the acquisition of requisite skills.

4. Results

The results are depicted in Table 1. There were eight centers with previous experience and 12, with no experience. In participating all centers at least 2 surgeons, mostly with partial dedication to Upper GI, were involved in the training.

Of those eight centers harboring previous experience in MIE, three applied thoracoscopy in lateral position, four used the prone position and one implemented the hybrid procedure, involving thoracoscopy in prone and laparotomy.

Out of 12 centers with no MIE experience, ten whole teams visited our center before the mentoring was applied in their own center; of these, an average of two interventions have been watched. The number of interventions performed under the guidance of the mentor was 3.7 (average 1 to 6) with different complications recorded. The complications that occurred were two perioperative bleedings (being solved during the thoracoscopy), five respiratory infections and four anastomotic leakages, also one patient deceased due to partial necrosis of the gastric conduit.

All the centers with previous experience continued with the mentoring program, leading to switching the technique to thoracoscopy in prone position. Of the 12 centers with no experience only three terminated the mentoring program; one of them temporarily. Reason for termination in one center was the non-participation of one of the surgeons in the program, in another center this was due to a decision to continue with the open approach and in the last case because the group had decided to stop with the Upper GI program. Moreover, in six centers the taught MIE interventions not only involved the 3-stage procedure but also the 2-stage Ivor Lewis by thoracoscopy in prone position. Interesting is that five surgeons of the proctored centers subsequently started mentoring other centers.

5. Discussion

Surgical residents and young surgeons are the principle targets for learning advanced MIS such as colorectal surgery. It is obvious that the majority of surgical residents with institutional programs will learn this approach during their residency period or during a fellowship period. However there are still surgeons to be taught various newly developed MIS procedures, mostly by quick courses or by mentoring programs [7–11]. For other minimally invasive interventions, such as gastric and esophageal resections for cancer, there are no regular programs involving the teaching opportunities with guidance of dedicated mentors. It is obvious that MIE taught to fellows in an experienced hospital will be the favorable choice, however this is not always available [12]. Apart from the