

How to set up a VATS lobectomy program

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Introduction

Video-assisted thoracic surgery (VATS) lobectomy was first performed in Italy in 1991 (1). It was first performed in our Unit in Edinburgh in 1992 (2). Although it was slow to be adopted initially, due to many factors, acceptance has risen rapidly and its use has doubled to 13% of all lobectomies in the UK in 2011 (3). In that time, many publications have highlighted the benefits of VATS lobectomy (4-8), including a shorter hospital stay, earlier chest tube removal, reduced complication rates and equivalent cancer free survival, with a 2008 systematic review demonstrating all these benefits in 3,114 VATS lobectomy patients compared to 3,256 open thoracotomy patients. Other studies have demonstrated a significantly higher administration of chemotherapy after VATS lobectomy compared to the open procedure (9,10). We need a line here to explain this comment Thus the benefits of VATS lobectomy are well reported and there is enthusiasm for its adoption. In this article, we attempt to provide a framework for the successful implementation of a VATS lobectomy program. This article represents a joint perspective of the Royal Infirmary of Edinburgh, where VATS lobectomies were first performed in the UK and from James Cook University Hospital where the VATS lobectomy program was set up according to lessons learnt from the Royal Infirmary, Edinburgh.

Surgical technique training

Ferguson *et al.* reported that, compared to the established surgeon, if carefully supervised, the first 50 cases by the trainee will be slower, but just as safe in terms of survival, blood loss and complications (11). Other authors have pointed to a learning curve over their first 50 cases at

their own institution, demonstrating reduced times and sometimes reduced blood loss and morbidity after this period (12,13). Our experience suggests that if the operating surgeon is able to spend a significant training period with a surgeon experienced in VATS surgery, then this greatly enhances their confidence when starting in their own practice. This also increases the likelihood that they will persist with a VATS lobectomy program. In addition, we recommend a period of training, whilst commencing a VATS lobectomy program in one's own institution with frequent re-visits to the original training institution, as inevitably there will be questions and difficulties which may be addressed by maintaining these links.

Team approach

We recommend reading an outstanding article published in the Harvard Business Review (14). This is a study of 16 hospitals, which implemented a minimally invasive cardiac surgical procedure. They studied 660 operations and examined human factors that determined successful implementation of the program and also factors that caused failure. This article details features of a successful team. It acknowledges that learning new procedures is a complex and time consuming exercise.

Initial procedure

Prior to assembling the surgical team, you must ensure that the hospital administration and operating theatres will be able to provide the resources and permission for the new procedure. In our own institution, this involved an application to the new procedures committee, but this may

be the responsibility of an appropriate ethics committee elsewhere. These committees oversee the implementation of all new procedures. Administration is appraised of the financial case for the procedure and costs for the initial and ongoing scenarios are outlined as best as possible. Delays may occur between organizing the surgical team and ultimate approval from administration to perform the first procedure. It is important to maintain team confidence and morale during this period. In general terms, familiarity with surgical equipment, e.g., staplers, should be present and the temptation to use new or unfamiliar instruments when commencing a VATS lobectomy program should be avoided.

The Harvard Business School report suggests that creating the right team is the key to successful implementation of a new procedure. This report cites 3 key factors in the creation of a successful team: (I) Successful teams are designed for learning; (II) Their leaders framed the challenge in such a way that team members were highly motivated to learn; (III) The leaders' behavior created an environment of psychological safety that fostered communication and innovation.

The team should have the hallmarks of successful co-operation including harmonious co-employment, discipline, general problem solving approach, keenness to learn together and general rapport. Substituting team members after initial training should be avoided if possible. The Harvard report found that teams, which changed regularly adopted the new procedure much more slowly than teams which remained the same. Our initial team consisted of 2 identified anesthetists, an operating department assistant, 2 scrub nurses, a surgeon's assistant, and 3 members of the ward staff in addition to the surgeon.

Training the surgical team

We commence training by taking the team together to the experienced unit to see 2 cases being performed. In order to promote team interaction, the team arrives together and stays overnight prior to the day's observation of the VATS lobectomies. The night before the operation, we will discuss the Harvard Business school paper in addition to hearing talks and watching videos about the surgical procedure. The idea is to get the team to spend time together talking about the operation and fostering the idea that everyone's contribution is important.

The concept of bringing all staff together promotes

harmony and a sense of equality with all contributions and interactions regarded as important. Firstly, patient positioning on the operating table, specific one-lung ventilation and pain management in VATS lobectomy is important. Secondly, ward staff, by observing the rapid mobilization of post-operative VATS lobectomy patients will be motivated to aspire to similar outcomes in their own unit. Thirdly, maintaining correspondence and communication with colleagues at the training institution is very important when questions arise at any stage. The staff will also have realistic expectations regarding the time that the procedures take and will observe the equipment in use.

Setting the correct tone as a team leader is vital to the success of the team. Repeated analysis of successful team working shows that all members of the team look to the leader for cues as to how they need to behave. Harvard Business School recommend: (I) Be accessible, make sure your team is encouraged to make suggestions and to flag potential problems and take them seriously; (II) Ask for input and proactively ask your team members what they think or what they thought could be improved; (III) Serve as a fallibility model. If the surgeon in charge occasionally in the debriefing says 'Well I shouldn't really have done it like that' or 'I wish I had done that bit differently', this encourages an atmosphere of open disclosure, in which team members will be comfortable to flag problems or raise issues that they are having.

The first case

We advocate trying to reduce the time between the team's first training event and the first case. Secondly, we advocate, if possible, inviting the senior surgeon from the training unit to our unit for the first case. If a scrub nurse is also able to come down then this is also very useful. This creates a positive atmosphere in the unit and a great desire to make sure things go well and professionally for the visiting surgeon. It also allows you to fully implement the procedure the way you have been taught. Issues like getting full flexion of the table, the correct analgesia and the correct equipment available does seem easier if you are asking for all these new changes 'for the visiting surgeon' rather than as a departure from what you normally do.

For this first day assisted and possibly for your first day solo, we would also advocate a comprehensive debrief, preferably in a relaxed environment. These debriefs will further allow the team to make suggestions, but are also

an important conclusion to the weeks of preparation. One recommendation for new procedures is often the prior setting of parameters for conversion. Agree with your team in advance the parameters with which you are going to convert the case to a thoracotomy. A reasonable parameter may be if you have not divided a pulmonary vessel by 1.5-2 hours. This will ensure that you will not get tunnel vision and struggle with difficult cases in the early phase, and the operative time will remain fairly uniform in all your cases. Converting the patient to the way you would have done the case the week before is preferable to the patient and staff undergoing a prolonged operation, which may also lead to further time-related problems, e.g., subsequent list cancellation.

The postoperative care of the VATS lobectomy patient deserves special attention. If the VATS lobectomy patient is treated like an open lobectomy patient then it is likely they will be discharged on the same day as an open lobectomy patient. Therefore, it is important to educate ward staff with respect to early mobilization. Avoiding catheters, unnecessary cannulae and wall suction all promote early mobilization. Air leaks may be managed with ambulatory bags instead of standard chest drain bottles, and even discharge home with the ambulatory bags will encourage early mobilization. Early discharge is potentially possible with measurable reduction in the length of hospital stay.

Public relations exercises and specific information public information briefs require special attention and are best performed in close consultation with appropriate hospital media departments and administration.

We recommend the following advice. Firstly, do not invite the media to follow your first case. This is very stressful for you and your staff and if things go wrong then you have no control over what they may report. Secondly, keep meticulous notes and begin a quality assurance program, which is mandatory for all new surgical procedures. Report and discuss any unexpected morbidity and mortality resulting from the relatively new procedure. Thirdly, develop an appropriate database specific to VATS lobectomy. This will obviously entail important factors, e.g., transfusion requirements, pain score, length of stay, chemotherapy compliance and survival compared to open lobectomy.

After an appropriate period of performing VATS lobectomy with good results, presentation of data to interested parties, e.g., respiratory physicians, medical oncologist, general practitioners and paramedical staff

may enhance overall knowledge and awareness for this procedure.

Conclusions

VATS lobectomy programs require special training for the surgical team and embarking on this program at the hospital level brings many challenges. This article outlines some guidelines for the surgeon wishing to commence a program for VATS lobectomy. Along with this article, many educational references and aids exist to assist with program set-up. Further information or clarification may be sought by contacting the corresponding author.

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