Editorial

How high is your conversion rate?—as high as necessary

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Since the introduction of lobectomy for lung cancer by video-assisted thoracoscopic surgery (VATS) in the 1990s, the development of different VATS techniques has resulted in many advances in thoracic surgery and patient care. With increasing experience and technical expertise, surgeons become more skilled in identifying the suitable patients for VATS lobectomy and completing the procedure thoracoscopically even in more complex cases. Several surgeons have developed professional reputations on highly technically challenging procedures but these specialist skills may not be transferable to all surgeons. Unfortunately, some surgeons may experience unnecessary complications by over stretching in their attempts to perform these complex manoeuvres. Careful case selection, with the help of detailed preoperative imaging, is necessary to plan a safe VATS procedure and avoid intraoperative bleeding. Factors including central tumour location and bulky hilar lymph node enlargement on preoperative images have been found to be associated with increased risk of conversion (1-3).

The ability to deal with major arterial bleeding is the primary safety concern of any surgeon especially during the VATS learning curve. The reported conversion rate due to vascular injury is less than 1% to 5% (4-7). Prevention or avoidance is the best management technique and the basic principles of vascular surgery should be invoked in order to prevent major intraoperative bleeding. The use of sharp rather than blunt dissection to enter the correct perivascular tissue plane is important and arterial side-branches should never be divided flush with the main artery in order to leave a "margin of error" for subsequent proximal control. In the event of failure and bleeding occurrence, the first step is to remain calm, avoid uncontrolled movements in immediate reaction and maintain a clear thoracoscopic view (6,8). One must prevent panic in the operating theatre and the impression of a crisis

Guo and colleagues in their article have outlined the basic principles of management together with some innovative remedial approaches (9). We support their first step to apply local pressure on the injury either with the metal suction catheter or by the 'swab-on-a-stick' method (10). Simple suture control may then be possible. We also agree with their approach to obtain proximal control of the main pulmonary artery with an atraumatic clamp. This may require extension of an existing incision or the placement of another more convenient access port. However, we are concerned about their description of the use of a toothed clamp to attempt direct closure of an arterial laceration to facilitate suture closure. As others have suggested (8) we do not recommend the use of such clamps or clips on fragile pulmonary arteries due to the risk of extending the vascular injury by traction or even the accidental displacement during manipulation of the lobe.

Whilst we can be impressed by successful surgical escapology, often the highlight of any conference video session, one must not ignore the obvious solution: convert from VATS to open thoracotomy. This is never more true than in any surgeon's initial experience of simple VATS or more complex resections. Inevitably with increasing experience the conversion rate will fall. Puri *et al.* (11) demonstrated a reduction in the conversion rate in line with increasing unit experience, where conversion rates fell from 28% to 11% over a nine-year period. Similarly, Gazala *et al.* (12) noted their conversion rate fell from 15% to 11% over a three-year period. Highly proficient VATS lobectomy programs are able to safely achieve conversion rates as low

as 2.5% (7). Increasing and optimal application of VATS lung resection should maintain a low but steady conversion rate to indicate maximal utilisation.

Is conversion from VATS to open surgery harmful to the patient?

Byun *et al.* (3) concluded in their analysis of unexpected conversion to thoracotomy during VATS lobectomy for lung cancer that the conversion does not appear to increase the overall surgical mortality and morbidity. Similarly, Park *et al.* (13) analysed retrospectively both early and late postoperative outcomes after thoracotomy conversion from VATS and found that unplanned conversion to open thoracotomy does not appear to compromise the prognosis.

Is conversion from VATS to open surgery harmful to the surgeon?

The use of "conversion rate" as an outcome measure of surgical performance should be discouraged. Far from being a "badge of failure" it should be viewed as the act of the responsible operator whose first duty is to the safety of their patient. Trainees and established surgeons should be proud of a successful conversion which prevented unnecessary blood transfusion or more extensive parenchymal loss. Skin incisions will heal but lung tissue will never regenerate. The ability to repair simple vascular injuries, as described by Guo *et al.*, is a skill to be acquired by established VATS practitioners in the simulation laboratory not as a first-time emergency procedure in the bleeding patient. But safety first conversion must be the default position not cavalier risk-taking to preserve a mythical zero conversion rate. The when asked: "How high is your conversion rate?" the answer should be "as high as necessary".

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Footnote

Conflicts of Interest: The authors have no conflicts of interest to declare.

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