



Does conversion from a minimally invasive to open procedure hurt the patient, the surgeon's ego, or the healthcare system?

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Provenance: This is an invited article commissioned by the Section Editor Shuangjiang Li (Department of Thoracic Surgery and West China Medical Center, West China Hospital, Sichuan University, Chengdu, China).

Comment on: Fourdrain A, De Dominicis F, Iquille J, *et al.* Intraoperative conversion during video-assisted thoracoscopy does not constitute a treatment failure. *Eur J Cardiothorac Surg* 2019;55:660-5.

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Dr. Fourdrain and colleagues have presented an interesting article that attempts to answer if intraoperative conversion to thoracotomy from a video-assisted thoracoscopic approach is harmful to patients. It is an important question, and few if any articles have attempted to answer it. This question has clinical value as well—if intraoperative conversion is harmful and leads to poorer patient outcomes, if it adds operative time and expense, or if the surgeon skill set or patient anatomy indicates that intraoperative conversion is more than likely—should the surgeon just start off open? How would this impact the learning curve that so many of us have started on? We have been taught to go as far as you can in a pulmonary resection with minimally invasive techniques [via video-assisted thoracoscopic surgery (VATS) or robotically] and then convert to thoracotomy only if absolutely necessary. We now know that minimally invasive platforms offer patients real advantages over thoracotomy, including decreased hospital length of stay, decreased operative time as surgeon skill improves, and lower rates of patient morbidity and mortality (1-3). We applaud the author's question but fear the data set in this particular study does not allow us to adequately answer it.

Perhaps the most important theoretical consequence of conversion is the long-term effects a thoracotomy may have on long-term cancer survival or disease-free recurrence compared to a minimally invasive operation. This study is focuses only on short-term perioperative results. Second, the data presented in this article has some red flags. We do not mean to disparage the authors in any way, rather we

congratulate them—but we have to mention some facts. Some of this data perhaps does not accurately reflect the current state of VATS even when taking into account a surgeon's new learning curve, and thus we fear may not be translatable to the other thoracic surgical practices. The data points from the study that stand out include: (I) only 50% of patients were selected for VATS over thoracotomy (301 for VATS *vs.* 309 for thoracotomy); (II) only 7% of patients in the VATS and VATS conversion group combined had a T2b tumor; (III) there was an 18.1% conversion rate from VATS to thoracotomy; (IV) 109 of the initial 919 patients (11.9%) underwent pneumonectomy; and (V) the mortality rates for VATS with conversion were 1.8% at 30 days and 5.4% at 90 days.

These results are drastically different from our own practice even if we include our learning curve for the robotic approach: 98% of our patients are selected for robotics for elective lung cancer resection over thoracotomy, T2b tumors or larger represents 29% in our series using minimally invasive techniques, we have a 4% conversion rate from the robotic platform to open thoracotomy, a 1% pneumonectomy rate, a 0.3% 30-day and 0.6% 90-day mortality rate (4-6).

If we compare this study to other selected historic VATS series (*Table 1*), we see that open conversion rate, 30- and 90-day mortality rates are significantly higher in this study, even accounting for a learning curve inherent with a new surgical technique. Does this mean the comparison VATS group may be too different? If the patient population in

Table 1 Selected publications—thoracotomy *vs.* VATS outcomes and VATS outcomes alone

Author	Year	# of patients	# starting with open thoracotomy	# starting with VATS	Conversion rate (%)	30-day mortality VATS (%)	30-day mortality thoracotomy (%)
Kirby <i>et al.</i> (7)	1995	61	31	30	3 (10.0)	0	0
Ohbuchi <i>et al.</i> (8)	1998	70	35	35	0	Not analyzed	Not analyzed
Demmy <i>et al.</i> (9)	1999	41	19	22	3 (13.6)	2 (9.1)	1 (5.3)
Petersen <i>et al.</i> (10)	2006	97	85	12	1 (8.3)	0	4 (4.7)
McKenna <i>et al.</i> (11)	2006	1,100	0	1,100	28 (2.5)	9 (0.8)	N/A
Whitson <i>et al.</i> (12)	2007	147	88	59	11 (18.6)	0	0
Paul <i>et al.</i> (13) (STS database)	2010	6,323	Propensity-matched to 1,281 for both cohorts		N/A	12 (0.94)	13 (1.0)
Falcoz <i>et al.</i> (2) (ESTS database)	2016	28,771	Propensity-matched to 2,721 for both cohorts		N/A	27 (1.0)	52 (1.9)
Long <i>et al.</i> (14)	2018	425	210	215	8 (3.7)	0	0

VATS, video-assisted thoracoscopic surgery; STS, Society of Thoracic Surgeons; ESTS, European Society of Thoracic Surgeons; N/A, not applicable.

this study is so drastically different from the majority of the published literature, can we safely answer the important question the authors have proposed? Perhaps a database study with larger numbers is warranted but only if we have reliable granular data on when operations were truly converted and if we can gather accurate 5-year follow-up data. Based on this article, all we can say for now is that when these surgeons examine short-term outcomes within their own practice, they have seen no disadvantageous effects when converting from VATS to open thoracotomy.

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Footnote

Conflicts of Interest: Dr. Cerfolio discloses relationships with Bovie, Community Health Services, Covidien/Medtronic, C-SATS, Davol/Bard, Ethicon, Google/Verb, Intuitive Surgical, KCI/Acelity Company, Myriad Genetics, Pinnacle, TEGO Corporation and is the president of ROLO-7 consulting firm. Dr. Ferrari-Light has no conflicts of interest to declare.

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