



Academic or non-academic: should we really pick one?

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Improving oncologic outcomes as well as the efficacy of lung cancer surgery in early-stage non-small cell lung cancer (NSCLC) has ever since been a priority in thoracic surgery. Multiple factors, e.g., video-assisted thoracic surgery (VATS) have already been identified to reduce morbidity and mortality (1). The impact of hospital volume on patient outcomes is an ongoing controversial debate (2), nevertheless there is increasing evidence of high-volume centres showing better patient outcomes (3-5). Moreover, in large retrospective European and US-American investigations, better overall survival and surgical outcomes in academic versus non-academic hospitals were shown (6,7). In-hospital mortality has moreover been reported to be reduced in patients undergoing lung cancer resections in teaching hospitals regardless of the surgical volume (8). Not to forget, surgeon specialty (general versus thoracic or cardiothoracic surgery) and surgeon volume are important determinants of outcome in lung cancer resections (9,10). Zbytniewski *et al.* retrospectively illuminated the current situation of this context in Poland in their publication on “The effectiveness of surgical treatment of lung cancer in Polish academic and nonacademic centers” (11).

In this retrospective analysis of 31,777 Polish patients, Zbytniewski *et al.* compared academic versus non-academic centres with regards to postoperative outcomes. Despite a more accurate staging, overall, 5-year survival

was not affected. Length of stay (LOS) and postoperative complications, however, were improved in academic centres. Median hospital volume in academic centres was reported as 97.5 and 54.5 cases/year in non-academic institutions.

Matching the current consensus in literature, Zbytniewski *et al.* have shown that academic centres show better perioperative patient outcomes in early-stage NSCLC resection. This superiority of academic hospitals is certainly partially accountable to the more experienced way of dealing with complications (12), as well as the fact that academic centres provide highly specialized multidisciplinary treatment facilities and infrastructure (e.g., intensive care units).

As a matter of fact, seen in the study results, academic centres in Poland simultaneously have a higher caseload than non-academic centres. Considering those two variables in the quote, we were questioning the fact, which one of them can be attributed to be the causative force for the outcome-difference between academic and non-academic facilities? Can we really reliably divide the influence of academic affiliation and numerical volume to receive valid answers? As previously discussed by Bach *et al.*, the underlying etiologies contributing to improved NSCLC survival at academic facilities were considered to be related to higher surgical caseload (13), which however could not be scientifically proven (14). Lim *et al.* just recently argued

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against the volume-outcome correlation in academic centres when presenting the preliminary results of the MARS 2 clinical phase III trial at the 2023 World Conference on Lung Cancer. All the centres included in MARS 2 were national centres of surgical expertise for mesothelioma, independent of the hospital volume (15).

Let us take a closer look at the statement of improved morbidity and mortality following NSCLC resection in academic hospitals in related published articles (7) from a different perspective and be slightly provocative: Is the type of healthcare facility an independent determinant of surgical outcome following early-stage NSCLC resection? As published evidence supporting this thesis is predominant, our clearly defined task has to be surgical centralization. In 2020, Ely *et al.* published their data on centralization of thoracic surgery units in the US, successfully increasing both hospital and surgeon volume (16). Spinning that wheel further, higher surgical volume has shown better patient outcomes (17). However, hospital volume and definition of high versus low volume centres are very heterogeneous, depending on geographical region, population density and catchment area (9). Baum *et al.* for example described numbers of >140 anatomical resections/year as high volume as compared to less than 27 cases/year in low volume centres in Germany (12). Zbytniewski *et al.* moreover mentioned the results of Luchtenborg *et al.*, who showed that in centres with ≥ 150 resections/year, survival significantly improved as compared to low volume centres with <70 resections/year (4). Therefore, a comparison of the published studies can only be made with extreme caution avoiding to compare apples with oranges.

Putting the fact, that both surgeon and hospital volume correlate with better outcomes, together, we claim that it does indeed make sense for thoracic trainees to spend part of their thoracic training in a high-volume and/or academic centre to profit from apparent availabilities of more VATS cases, more complex cases in comorbid patients in highly specialized surroundings including better perioperative medical care and facilities. This centralization of education should go hand in hand with the centralization of the surgical services.

To compensate for a small caseload in low volume centres, simulation training might be considered to close the gap to high-volume centres as well as keeping specialist surgeons' volume as high as possible to keep patient outcomes optimized (18).

The quest to improve patient outcomes is a constant topic, like the current study of Zbytniewski *et al.* shows.

Whether it can be achieved by increasing the surgeon or hospital volume or the centralization of surgical services remains a matter of debate. Considering the available literature, we strongly vote for the centralization of thoracic surgery services to improve outcomes following lung resections for early-stage NSCLC.

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