

The current thoracic trauma practice amongst thoracic surgeons: a survey of members of the European Society of Thoracic Surgeons (ESTS)

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Abstract

Objectives

The role of the thoracic surgeon in management of trauma is not clearly defined. The European Society of Thoracic Surgeons (ESTS) sent out a survey to understand the current practice of thoracic surgeons in respect of thoracic trauma.

Methods

All ESTS members were invited (November – December 2023) to complete an online questionnaire of 28 questionnaires, designed by the ESTS thoracic trauma working group.

Results

A total of 204 responses were obtained. Most responses came from Italy and Spain (16 each) with 94.12% of respondents providing routine cover for thoracic trauma and 86.76% having an active thoracic surgical practice. 72% stated that thoracic trauma admissions are admitted under thoracic surgical care. 55.39% stated they had a dedicated trauma team in their institution. Rib fractures with a chest drain were the most frequent reason for admission under thoracic care. There was significant variability in MDT working, composition and follow up.

Conclusion

Whilst thoracic surgeons are actively involved in thoracic trauma, there is variability in important aspects including admitting practice, MDT working and follow up. Guidance focusing on non-operative aspects of thoracic trauma care may help streamline pathways and processes that can enhance patient care.

Introduction

Rib fractures, blunt as well as penetrating chest trauma are frequent reasons for the thoracic surgeon to be contacted for advice. However, the role of the thoracic surgeon is by no means defined in this area. The management of thoracic trauma is frequently non operative with a particular need for multi-disciplinary collaboration – with an emphasis on support from allied health professional members of the team. Indeed, when operative intervention is required such as surgical stabilisation of rib fractures, this may not be undertaken by the thoracic surgeon. The pathways and processes for patients are clearly not well defined and can vary significantly.

The European Society of Thoracic Surgeons (ESTS), which represents members of practicing and accredited thoracic surgeons as well as those in training through European and non-European countries,

designed a questionnaire to try and further understand how thoracic surgeons are currently involved in the practice of thoracic trauma. The intention is to assess and give a general perspective of the current situation in key practical areas that are of relevance to everyday clinical practice in managing thoracic trauma. The results will be disseminated with the aim of identifying potential areas in thoracic trauma care that might benefit from being streamlined, enhanced and better defined to improve patient care.

Materials and Methods

Ethical statement

This study was conducted in accordance with the Declaration of Helsinki and the relevant national and institutional guidelines for survey-based research involving healthcare professionals. Because this study was a voluntary, non-interventional opinion survey among accredited surgeons and trainees with no patients or patient identifiable data involved, formal ethical review and approval was waived/deemed unnecessary under national legislation (Polish Act of 5 December 1996 on the Professions of Physician and Dentist, Article 21, and the UK Health Research Authority regulations). Informed consent was obtained from all participants prior to starting the survey: respondents were explicitly informed of the study's scope and objectives on the introductory page, and completion and submission of the online questionnaire constituted voluntary informed consent to participate and for anonymized data to be used for research and publication purposes.

Statistical analysis

Descriptive statistics were used to summarize the results.

There was no confidential information required for this study. Data were reported as frequency, number and percentage to best illustrate in each setting.

The datasets used and analysed during the current study available from the corresponding author on reasonable request.

Results

Demographics

The total responses received were 204 (11% response rate), inclusive of skipped responses. 1 respondent stated they were not a member of ESTS and so their results were not included in the overall analysis – 203 respondents' questionnaires were subsequently analysed. Questions 1 – 5 assessed the demographics. A wide representation was observed as outlined in Table 1 with maximum participation from Italy and Spain (16 each). 163 respondents were male and 40 were female. Responders were reasonably evenly distributed between different age groups. Eight (3.92%) of them were between 25 and 30 years old, 64 (31.37%) were between 31 and 40, 67 (32.84%) were between 41 and 50 and 64 were older than 51.

One hundred and forty seven (72.06%) were working in academic hospitals, with 24 (11.76%) were working in supra-regional/non-academic hospitals and 23 (11.33%) in regional/non-academic hospitals. 75 respondents (35.46%) were based on site at the centre receiving the injured patient, 42 (20.68%) were based within 1-5 miles and 72 (35.46%) over 5 miles.

Thoracic surgical provision of thoracic trauma

The vast majority of respondents 191 (94%) stated they provide clinical cover for the management of thoracic trauma. 176 (86.69%) respondents indicated that they have an active thoracic surgical practice with a smaller number, 148 (72.90%), admitting patients with thoracic trauma to the thoracic surgical unit. The type of injury was then noted to impact if the patient would be admitted under the thoracic service – patients with isolated rib fracture (eighteen, 12%) and those with multi system injuries (thirty one, 21%) were relatively infrequently admitted.

In those patients admitted to hospital with chest injuries, requiring thoracic specialist input, but not under thoracic surgical care there was most frequently a daily outreach review from the thoracic surgical team (55.17%). Other respondents noted that they review patients on alternate days (16.25%) and weekly (7.88%). Four respondents stated they would never review thoracic surgical patients with trauma whilst others (seventeen, 8.37%) were dependent on clinical request from colleagues, patient deterioration, or clinical change in status of the patient.

One hundred and sixty three respondents indicated that they had a standard operating procedure for critically unwell patients with chest trauma presenting to their unit. One hundred and thirty seven (67.48%) respondents stated that should a salvage thoracotomy be required in the emergency room then this would be undertaken by the thoracic surgeon. In other cases it would be undertaken by the general surgeon (14.77%), emergency physician (8.37%) and other colleagues such as vascular surgery.

The admission of thoracic trauma patients was very likely or likely to impact the units ability to undertaken elective surgical activity such as lung cancer resection surgery in fifty one (25.12%) of respondents. A similar number of forty four (21.67%) of respondents with either dissatisfied or very dissatisfied with the theatre access they had available to them to operate on thoracic trauma cases including for rib fixation.

Multi-disciplinary working

The role of a multi-disciplinary team meeting was felt to be of use/have a role in the management of patients with thoracic trauma by one hundred and ninety two (94.58%) of respondents. Further analysis of this showed that sixty six (32.51%) respondents felt it was useful in any patient with thoracic trauma. Ninety one (44.82%) felt it was useful for patients who had required and were currently admitted into the intensive care unit. Five respondents felt there was no role for MDT working in patients with thoracic trauma and five respondents felt they were uncertain as to its role.

One hundred and thirteen respondents stated that they had a dedicated trauma team that facilitated MDT working. Of those, the thoracic surgeon was a member in 68.7% of cases. The most commonly represented members were general surgeons and anaesthesiologists. Other commonly represented members were trauma nurses, physiotherapists and occupational therapists. 25% of respondents felt that they were not staffed sufficiently to adequately cover thoracic surgical trauma.

Of the 176 respondents with an active thoracic surgical trauma practice, there was a variety in the forms of analgesia offered – with the most frequently offered analgesia being epidurals (59.90%) and paravertebral catheters (54.95%). Erector spinae plane blocks and serratus anterior plane blocks were offered by 42.08% and 31.19% respondents respectively. In 96.52% of respondents the pain service was carried out by the anaesthesiologists with allied health professionals also contributing.

In respect of patients presenting with chest trauma, 70.79% stated that they had tailored pathways including for those who may be considered elderly. The definition considered to be elderly was varied and is illustrated in table 3. 73.53% of respondents indicated that they are able to achieve regular input from geriatricians for patients with chest trauma. In the multiply injured patient with both spinal and rib fractures requiring fixation – 40.91% stated they would fix the ribs and spine simultaneously with 49.94% addressing the spine first.

Follow up after rib fractures

In respect of follow up after chest trauma including rib fractures, there was a wide variety of responses as indicated in table 2. There was significant variation across the first six weeks with a very small minority offering no follow up at all.

Discussion

There has been significant progression over recent years in the operative technique and management of thoracic trauma including the development of recommendations for surgical stabilisation rib fractures (SSRF). There has been a growing body of literature demonstrating SSRF can improve outcomes.^{1,2,3} However, with the care being surgical or not, the non-operative aspects of care remain crucial with current practice and protocols relating to the way patients progress through the healthcare system and how this is structured not being clearly defined. With morbidity and mortality that is not negligible, understanding and identifying areas where processes and pathways can be improved through guidance is felt to be of value in improving patient outcomes. An initial step in addressing this is by making attempts to identify current practice of which surveys are a useful tool.

The picture is complex from the outset with thoracic trauma an area that is not only the domain of thoracic surgeons but is often managed by other surgical specialties including general, acute and orthopaedic surgery – a picture with even greater variation according to location of practice. There is, however, little in the way of published data in this respect. The role that the thoracic surgeon can have in thoracic trauma is well recognised in practice but unlike other aspects of thoracic surgery practice,

actual daily practice and level of thoracic surgical involvement is not clearly described and is varied. This survey demonstrates that, the majority, but not all thoracic surgeons are actively involved in providing cover for thoracic trauma with less having a thoracic trauma surgical practice. This of course highlights the potential ramifications in terms of patient care with referral networks and patterns but also other factors such as training. It may also be an important factor when considering the need to increase adoption of SSRF with the increasing evidence that has continued to emerge. On a clinical level it is important that each patient can benefit from referral and discussion with a unit that is offering this service.

Thoracic surgical input into thoracic trauma care is not dictated by only expertise and interest. There are other numerous other factors involved – structure and location of the unit, staffing levels, demand from other work and access to acute/ emergency theatres. How units can develop chest wall injury centres has been described⁴ and there is an important consideration that surgical management of thoracic trauma is potentially an area that would facilitate growth of individual units with SSRF forecasted to continue increasing. There is an argument to be made that thoracic surgeons should be and remain active in this respect as, already stated, other specialties may manage the practice in that area and referral patterns are difficult to change once practices are established.

MDT working is of course well described and standardised in other aspects of thoracic surgical practice. There is increasing recognition of the need for MDT working in the management of thoracic trauma recognising the need to adapt working for the unplanned nature of the work and need for time sensitive decision making. This is apparent straight from admission were, irrespective of the need for surgical intervention or not, there is an important requirement to ensure that the patient receives adequate analgesia. The survey demonstrates the importance anaesthetists have in the respect of providing loco-regional anaesthesia, providing the service frequently. Interestingly, epidural was still the most commonly used modality but with both erector spinae and serratus anterior blocks well represented – acknowledging the benefits they are demonstrating to bring.⁵

Following initial presentation, there is often debate about where patients are best cared for and this will continue to be debated but an MDT approach can alleviate potential concerns that all of a patients needs may not be met by being admitted solely under a thoracic surgeon. The elderly patient with chest trauma requires management of this but also frequently management of co-morbidity and are more likely to have significant ongoing rehabilitation needs. The survey illustrates that the majority of respondents were able to seek geriatrician input for patients considered to be elderly being admitted to their ward. The results also may be seen as support for those who are yet to have geriatrician support in progressing their unit.

Another aspect of thoracic trauma care where there is limited evidence is regarding the follow up, and longer term outcomes including quality of life of patients with rib fractures irrespective of if SSRF has been undertaken. The way in which patients should be followed up is not clearly prescribed and this is reflected in the outcome of the survey with significant variability in the short term.

Limitations

This survey does have potential limitations. The first is regarding the representativeness of the study, with our response rate relatively low and toward the lower end of recent ESTS surveys. This low response rate can be partially explained by the fact that there was no formal advertisement campaign launched for the survey. Additionally, thoracic trauma is not typically the key aspect of thoracic surgeons workload – potentially those who are not involved in it regularly, did not respond. This might have created a sampling bias, in addition, to ultimately affecting the outcomes of the survey.

There is also the point that this was a survey relating to thoracic trauma of only thoracic surgeons and so the views and practices of non-thoracic surgeons is not represented.

A further limitation is that the questionnaire underlying the survey was designed by experts in the field of the ESTS thoracic trauma working group and a more thorough Delphi consensus process for developing and pre-testing the questions would have made the design of the survey more robust.

Conclusion

This survey provides evidence of and highlights the involvement of thoracic surgeons in the management of thoracic trauma. There is variability in the degree of involvement, the way in which services are delivered and ultimately the way patients are cared for. Continued focus on streamlining the pathway and processes relating to thoracic trauma with focus on MDT working , referral pathways and follow up may help to further optimise the care of this group of patients.

Declarations

- Ethical Approval and Consent to participate

Formal institutional review board (IRB) approval was deemed unnecessary in accordance with national regulations governing voluntary opinion surveys of healthcare professionals without patient involvement (Independent Bioethics Committee for Scientific Research at Medical University of Gdańsk / UK HRA). Electronic informed consent was obtained from all individual participants prior to survey completion.

- Consent for publication

Consent for publication was not required, data was anonymous.

- Availability of data and materials.

All data generated or analysed during this study are included in this published article [and its supplementary information files]

- Competing interests

Not applicable.

- Funding

Not applicable.

- Authors' contributions

M.G., Z.B., M.C., D.S. and T.W. wrote the main manuscript text , M.O. distributed the survey and M.G. prepared Table 1 and Figure 1. All authors reviewed the manuscript.

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Tables

Table 1
Demographics of survey participation

Regions worldwide within ESTS	
Europe with UK/ Ireland region	Italy: 16, Germany: 14, Spain: 16, France: 7, Belgium 10:, Austria 4:, Czech Republic 3:, Denmark:6, Greece: 11, Hungary: 7, Netherlands: 6, Poland: 2, Portugal: 3, Sweden: 1, Serbia: 4, Slovakia: 3, Slovenia:3, Switzerland: 9, Turkey: 12, UK: 10, Ukraine: 5, Ireland: 3, Luxembourg:, Finland:, Belarus:, Macedonia:, Moldova: 1, Norway: 1, Lithuania: 2, Croatia 1, Bulgaria 1, Romania:1, Albania 1, Azerbaijan 1
Asian region	India 3, Pakistan:1
Middle – East region	Jordan : 4, Morocco:3, Saudi Arabia 2, Egypt: 2, UAE; 1, Iran: 1, Lebanon:1, Tunisia 1
African Region	Ghana 1, Ivory Coast 1, Mozambique: 1
USA/ Canada	Brazil 7, Canada 2, Guatemala 1, Ecuador 1,, Mexico: 1, Chile 1, Uruguay 1, Argentina 1, USA 1
Australasia Region (1)	New Zealand 1

Table 2
Outpatient follow up timing for patients who
have sustained thoracic trauma and rib
fractures

Time period	Number of responses (%)
No follow up	3 (1.47%)
1–2 weeks	59 (29.06%)
2–4 weeks	67 (33.00%)
4–6 weeks	55 (27.09%)
After 6 weeks	12 (5.91%)

Table 3
Age respondents considered a patient to be
classed as elderly

Age (years of age)	Number of responses (%)
> 60	11 (5.4%)
> 65	31 (15.27%)
> 70	48 (23.64%)
> 75	57 (28.07%)
> 80	56 (27.58%)

Figures

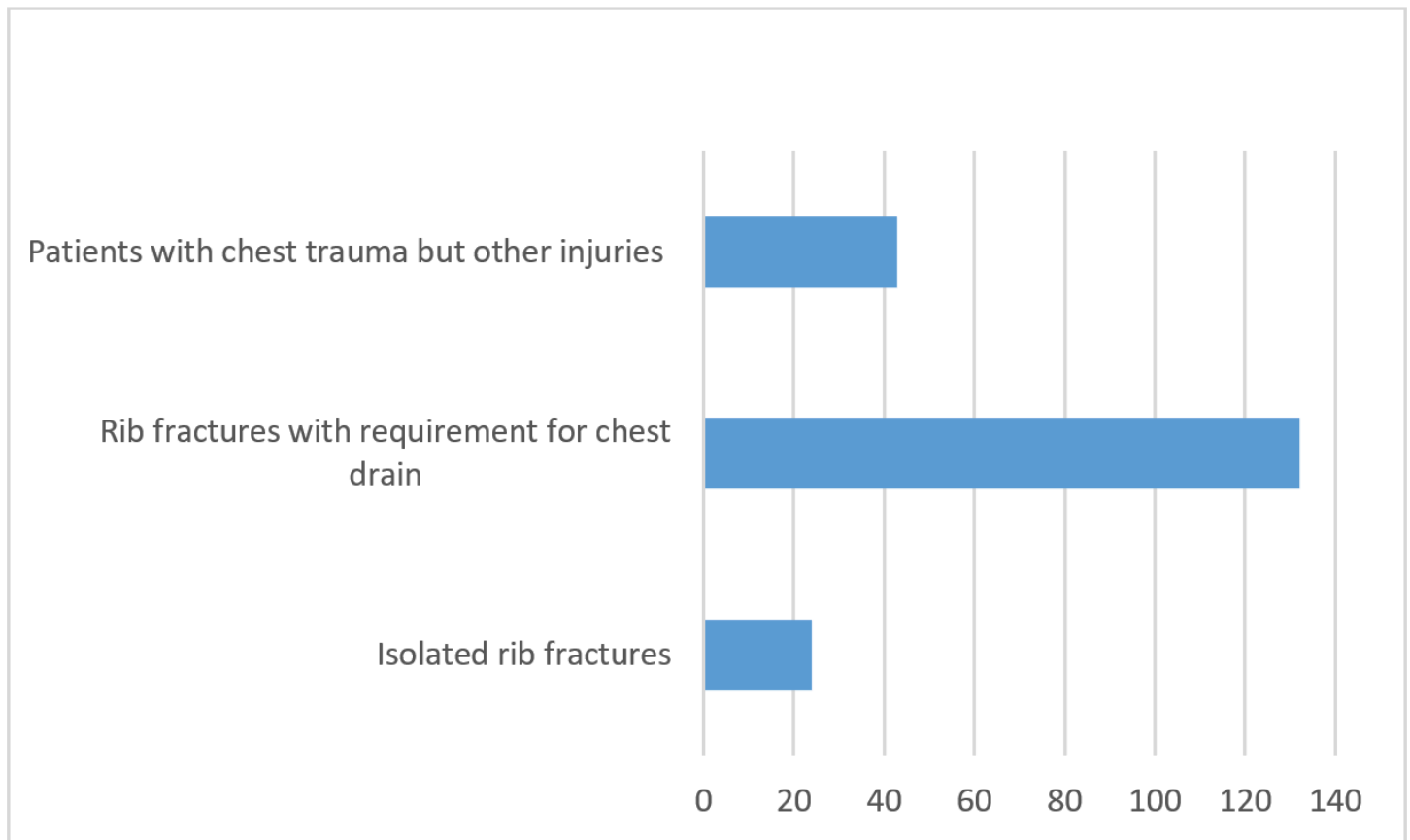


Figure 1

Injuries admitted under the thoracic surgical service

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- [ThoracicTraumaWorkingGroupSurvey.xlsx](#)