



Trauma care in German-speaking countries: have changes in the curricula led to changes in practice after 10 years?

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Received: 31 July 2017 / Accepted: 19 December 2017 / Published online: 6 January 2018
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Abstract

Purpose Traditionally, in the German-speaking countries, trauma patients are treated by general surgeons specialized in trauma surgery known as the Unfallchirurg. Over the last decade, a trend towards a lower influence of surgeons and a higher influence of subspecialties in the emergency department has been noted. With additional transformations in the health care system towards highly specialized medicine and the arising of new (sub-) specialties, diversification in the management of the trauma patient appears to occur. The new curricula for surgical disciplines providing trauma care will widen this issue even further, moreover, triggered by the Anglo-American medical model. The primary aim of this study was to evaluate the current situation in German-speaking countries concerning the management of trauma patients. The interfaces between emergency physicians, orthopaedic and general surgeons have been investigated concerning the management of the trauma patients. Additionally, different future scenarios have been evaluated.

Methods An online questionnaire was submitted to members of the German Society of Trauma and Orthopaedic Surgery [Deutsche Gesellschaft für Orthopädie und Unfallchirurgie (DGOU)], including both general and orthopaedic surgeons, emergency physicians and also some members from Austria, the Netherlands and Switzerland. Questions dealt with demographic data, the current situation in the clinic of the responders in terms of management of mono- and polytrauma patients as well as fracture care. In addition, various future scenarios were evaluated.

Results 293 members of the DGOU answered the questionnaire. The majority of the responders (45%) were orthopaedic surgeons and 34% were general trauma surgeons. Sixty-two per cent of hospitals run their emergency departments with emergency physicians. Treatment of both mono- and polytrauma patients in the emergency department is equally distributed between general and orthopaedic surgeons. Fracture care, however, is predominantly (65%) being performed by general trauma surgeons in both mono- and polytrauma patients. The majority of the respondents (80%) do not want to change the current situation and predict that in the future fracture care will still be performed by general surgeons' specialized in trauma surgery. Approximately two-thirds of the responders do not believe that emergency physicians will play a bigger role in the management of trauma patients in the future.

Conclusion Despite the growing importance of emergency physicians, separated in the emergency room between surgical and internal medicine fields, in the acute care of surgical patients in the emergency departments, their role in the management of the polytraumatized patients remains limited. More than 13 years after the new curricula for orthopaedic and general surgery have been implemented in Germany, fracture care is still predominantly provided by general surgeons specialized in trauma surgery. In conclusion, it seems that the general surgeon specialized in trauma surgery still plays and wants to play the key role in the management of the polytrauma patient and fracture care in German-speaking countries.

Keywords Polytrauma · Fracture care · General surgery · Emergency physician

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Introduction

An increasing ageing population and the rising health care costs lead to changes in the health care system in western countries. The upcoming of emergency physicians and an increase in the number of highly specialized physicians

have led in different institutions to a change in the organization of the management of the trauma patient [1].

In the European Union, there are historically two main streams in the organization of the polytrauma patient [2].

In the Anglo-American system, emergency physicians play a key role in the initial management of the trauma patient. Depending on the needs, subspecialties (i.e. orthopaedic surgeons, neuro-, thoracic-, vascular-, visceral surgeons, etc.) play a consulting role [3, 4].

In German-speaking countries, general surgeons were used to manage the emergency department and took care of the polytrauma patients [1, 3]. The so-called trauma surgeon or “Spezieller Unfallchirurg” used to be a further specialized general surgeon. They took care of the entire trauma patient including visceral, thoracic trauma and fracture care. The advantage was that one surgeon was the process owner of the polytrauma patient and had knowledge of fracture care, soft tissue injuries and hollow cavity injuries. Moreover, many of these surgeons had an extensive expertise in the management of critical care patients on the Intensive Care Unit (ICU) [3, 5].

In Germany, a new curriculum for Orthopaedic and Trauma surgery was implemented in 2003. Since then trauma surgery is no longer a specialization for general surgery, but a specialization combined with orthopaedic surgery following a “common trunk” basic surgical education [6]. Additionally, in Austria, a new curriculum for both orthopaedic and traumatology was instituted by the government in 2015 [1]. In Switzerland, traumatology of the locomotor system is a part in the education curriculum of both the general and orthopaedic surgeons.

Despite efforts to structure trauma care with the generally accepted and applied American Trauma Life Support (ATLS) and the European Board of trauma surgery and accordingly a European Examination, there is a wide variation—frequently triggered by local effects—on how polytrauma management should be organized. These changes gave rise to the question who provides trauma care for polytraumatized patients in German-speaking countries after the recent changes in the curricula of surgical specialist training.

The primary objective of the current study was to evaluate the current setting of trauma care in Germany, as a benchmark for the German orientated European countries, including the Netherlands, Belgium, Germany, Switzerland and Austria. A survey was performed to evaluate the interface between Trauma and Emergency care and to investigate the clinical impact of the changes in training that have occurred throughout the last decade. The second aim was to investigate how physicians expect their clinic to change in the future regarding the management of the trauma patients.

Materials and methods

A one-time online survey was developed by an expert committee and was distributed among the members of the DGOU [7]. The online survey was sent out once to all members of the DGOU.

The survey contained 13 questions and was divided into three sections.

1. General information

This first section gathered general information of the responders.

The responders were asked about their speciality (general surgeon, general surgeon specialized in trauma surgery, orthopaedic surgeon, orthopaedic surgeon specialized in trauma surgery, Emergency Physician) and their current position within their department. Moreover, was the level of experience evaluated.

For simplification, we grouped together:

- General and general trauma surgeons (Unfallchirurg) into the general trauma surgeon group.
- Orthopaedic and orthopaedic trauma surgeons into the orthopaedic trauma group.

2. Current situation in the clinic of the responder

The second section gathered information on the current situation in the clinic of the responder. The role of emergency physicians in the management of trauma patients in the emergency department was evaluated. It was evaluated who manages the acute surgical patient concerning the diagnostic work up. Furthermore, we evaluated the management of the mono trauma patient with an injury severity score (ISS) smaller than 16 and the polytrauma patient with an ISS over 16 [8]. Finally, it was evaluated who performed fracture care in both the mono and polytrauma patient.

3. Future prospect in the department

The third section contained questions evaluating the future perspective of the responder. The responders were asked whether they want to keep the current situation or they consider that emergency physicians will play a larger role in their clinical setting in future. Additionally, they were asked who will perform fracture care in both mono- and polytrauma patients in the future.

Results

Out of 4500 questionnaires sent out, 323 responded to the online survey (8% response rate).

Table 1 Group of > 10 years' experience ($n=283$)

Questions	Answer	Total numbers	Percentage
Keeping of the current situation	Yes	229	81
	No	54	19
Dominant role of the emergency physicians in the future	Yes	83	29
	No	200	71
Fracture care of polytrauma patients in the future	General surgeons	186	66
	Orthopaedic surgeons	97	34
Fracture care of monotrauma patients in the future	General surgeons	191	67
	Orthopaedic surgeons	92	33

Table 2 Group of < 10 years' experience ($n=40$)

Questions	Answer	Total numbers	Percentage
Keeping of the current situation	Yes	32	80
	No	8	20
Dominant role of the emergency physicians in the future	Yes	11	27.5
	No	29	72.5
Fracture care of polytrauma patients in the future	General surgeons	28	70
	Orthopaedic surgeons	12	30
Fracture care of monotrauma patients in the future	General surgeons	28	70
	Orthopaedic surgeons	12	30

Table 3 Results of the respondents' specialities

	Total number	Percentage
General (trauma) surgeon	110	34
Orthopaedic (trauma) surgeon	158	49
General and orthopaedic surgeons	48	15
Other	7	2
	323	100

The majority of the responders worked in Germany (84%). The remaining worked in the Netherlands (9%), Switzerland (4%) and Austria (3%).

General information

The majority of responders were orthopaedic surgeons (49%), 34% were general surgeons and 15% were both general and orthopaedic surgeons (see Table 1). The majority of the respondents (43%) were head of a department, 100 senior consultant and 85 junior consultants. Nearly, half the respondents (49%) had an experience of over 20 years, 38% had an experience of 10–20 years. Only 10% of the respondents had up to 10 years of experience (Tables 2 and 3).

Current situation

Emergency physicians work in 62% of the hospitals.

The acute surgical patient is managed by emergency physicians in 29%, by general surgeons in 37% and by sub-specialists in the remaining 34%.

The management of the monotrauma patient is performed in 44% by an orthopaedic surgeon and in 39% by a general surgeon. The remaining is managed by emergency physicians.

The management of the polytrauma patient is equally distributed between orthopaedic (45%) and general surgeons (45%). The remaining patients are managed by emergency physicians (7%) and subspecialties (3%).

Fracture care is provided by general surgeons in 67%, irrespective of mono- or polytrauma patient.

In terms of leadership, 80% of the respondents favour one trauma leader as the process owner of the treatment of polytrauma patient (Tables 4 and 5).

Future perspective

The majority of the survey respondents (81%) were pleased with the current situation and would like to keep it in the future.

Table 4 Results of trauma patient's management

	In polytrauma patients (%)	In monotrauma patients (%)
General (trauma) surgeon	45	39
Orthopaedic (trauma) surgeon	45	44
Other	10	17

Table 5 Results of fracture surgery performance

	In polytrauma patients (%)	In monotrauma patients (%)
General (trauma) surgeon	68	67
Orthopaedic (trauma) surgeon	32	33

Additionally, the majority of the respondents (71%) do not expect a more dominant role of the emergency physicians in the management of trauma patients.

In line with the current situation, the 65% of responders expect that the fracture care in the future will still be performed by general surgeons.

Experience bias

Since almost 90% of the responders had more than 10 years' experience, we analysed the answers in terms of less and more than 10 years' experience to quantify the experience bias. What we remarked, is that there is no difference regarding the current situation and future perspective as you can see in the tables.

Discussion

This is the first survey to investigate the interface between Trauma and Emergency care in a changing environment concerning the management of the trauma patient. Despite a tendency to highly specialized medicine in routine daily business, it seems that the general surgeon with further specialization in trauma surgery remains in a key position in the care of the trauma patient. The role of emergency physicians in the management of the polytrauma patient remains limited. Moreover, does this survey show that fracture care is currently still performed by general surgeons with further specialization in trauma surgery, despite the changed curricula in training of general and orthopaedic surgeries with the claim from orthopaedic surgeons to take over fracture care. Finally, does this survey among the members of the

DGOU demonstrate that the majority of the responders do not wish to change the current situation.

Changes in the population concerning age as well as the health care system lead to changes in the daily routine of a hospital [1]. A trend towards more specialization took place in internal medicine as well as in surgery. With historically two different ideas of the organization of the management of polytrauma patients (Anglo-American and "German System") in Europe, we were intrigued to get to know the consequences of this specialization. In the German health care system, the handling and managing of the polytrauma patient was clearly the job for the general surgeon specially trained in trauma surgery [3]. With the revision of the curricula in surgical training in 2003, Germany merged the two specialties orthopaedic and trauma surgeries into a new training of orthopaedic and trauma surgery. The idea was to adjust the curriculum to the changed health care system and to make the system more internationally comparable [3].

Austria followed in 2015, whereas in Switzerland and the Netherlands it is still separated [9]. Consequently, there seems to be no consensus of who is in charge of managing mono- and polytrauma patients in the clinical setting. It is still relatively equally distributed between orthopaedics and general surgeons as to whom is the responsible surgeon in case of a polytrauma. A reason might be that it is a new change of the curricula and not yet well implemented in the daily routine with no effort to change the current structures. With the broader education of the general surgeon in terms of hollow cavity, thoracic or vascular injury and intensive care medicine the general surgeon might be judged more capable of managing a polytrauma patient.

Moreover, despite that 80% of the respondents were from Germany and almost half were orthopaedic surgeons, the majority of the respondents still see fracture care in both mono- and polytrauma as the work domain of the general surgeons.

The above-mentioned specialization has the consequence to involve more and more specialized surgeons to treat one patient. Even the orthopaedic surgery for itself is split up in different organ specialities, which is good in terms of monotrauma patients, to get a specialized surgeon, who is well trained in that one specific organ. In handling a polytrauma patient that might be more difficult to achieve, 80% of the survey respondents favour one trauma leader, as the process owner of managing the polytraumatized patient. In already published studies, it is shown that leadership can improve the process of care in Trauma [4, 10].

With the emergency physicians, we have a discipline who has "the knowledge and skills required for the prevention, diagnosis and management of urgent and emergency aspects if illness and injury affecting patients of all age groups" [11]. The problem is there are still European countries who do not yet accept it as a medical speciality (i.e. the Netherlands)

Table 6 List of courses interesting for trauma residents

Course	Summary	Timing
Prehospital trauma life support (PHTLS)	Prehospital care	First year of training
Advanced trauma life support (ATLS)	Trauma course with a focus on standardising resuscitation and initial assessment of trauma patients in the `Golden Hour`	First year of training
European trauma course	Trauma training with a focus on team work and non-technical skills	First year of training
Definitive surgical trauma care (DSTC)	Strategic thinking and decision making in the management of the severely injured patients and provide them with practical surgical skills to manage major organ injuries	Final year of training
Polytrauma course provided by ESTES	Connects the knowledge of different disciplines in trauma care and aims to improve the quality of treatment	Final year of training
Major incident medical management and support (MIMMS)	Systematic approach to disaster medical management	Final year of training

[6, 12], whereas in other countries (i.e. United Kingdom) it is already enlisted [13]. In a published article in 2013, for example, the DGOU warned about the introduction of this discipline in Germany. They said that it would be a step back in terms of the quality of the emergency care and even a danger for the patients [14]. So, it is quite interesting that 60% of the respondents are working with emergency physicians, as more than 80% came from Germany. However, the involvement of the emergency physicians with acute surgical patients is only in 30%, in case of the diagnostic and management of mono trauma patients only 15%. That might be one reason why more than 70% of the respondents do not think emergency physicians will play a bigger role in managing trauma patients in the future. More than 80% want to keep the current situation, which might be impossible with an increase of the work load in trauma centres. There is a trend that patients with minor and no life-threatening diseases are not going to their general physician but directly to the emergency departments [15]. So if we take that into account, the role of the emergency physicians might get bigger in the future in taking care of this group of patients. The management for the acute surgical patient and even the management of mono trauma patient might be sufficiently handled by emergency physicians based on clear service level agreements. Since the specialty of the emergency physician is not yet established in all countries, it might be interesting to reevaluate the situation in the future, when the transition is more advanced.

For future discussions, it might be interesting to evaluate the positive effects on mortality depending on the specialist who is in charge. Between the European countries and the trauma systems, there are wide differences regarding the development and effectiveness [16, 17]. In several studies, it is proven that a trauma system can reduce the mortality by 15–25% [17, 18]. Which system has the best outcome is yet to decide, but there are trends among recent online surveys from Finland that the reported mortality in central Europe (Germany, Austria, Hungary, Czech Republic, Slovakia,

Switzerland, the Netherlands and Denmark) is lower than in the Scandinavian countries, the Baltic States, the United Kingdom and the Mediterranean countries [17, 19]. Moreover, could a more structured education for trauma residents improve training and outcome. In Table 6, we have suggested several courses that are offered for improving trauma care for residents in training.

Unfortunately, the overall response rate of our questionnaire was low. The questionnaire was sent out once to the members of the DGOU and we were not able to send out a reminder to increase the response rate. In an additional attempt to improve the response rate, we contacted the national societies of (orthopaedic) trauma surgery in German orientated countries (the Netherlands, Belgium, Austria and Switzerland). Due to privacy issues, we were unfortunately not able to contact the members of these societies individually, nor were the questionnaires further distributed. On the other hand, the responses that we have obtained are unique and reflect the current situation in Germany from different prospects. This is important and could provide the basis for future discussions on how to organize trauma care and optimize education in the future. We therefore believe that despite the response rate, we could regard this survey as a pilot study. We hope that it could serve as the basis for a pan-European study supported by the European Society of Trauma Surgery to get guidance to further optimize trauma care and training.

Another limitation of this evaluation is that it is based on an online survey. No data is provided referring exact numbers of patients treated by the responding surgeons. It might be interesting to match the answers of the surgeons with the number of treated patients regarding the fracture care surgery and mono- or polytrauma patients treated at the surgeon's hospital. Using the online questionnaires, we were able to obtain a good overview of the above-mentioned countries, although there was not a second mailing to get more responders. The response reflects the opinion of members of the DGOU. No other professionals involved

in emergency trauma care were included in this survey. The majority of the responses derive from German surgeons (80%); therefore, an assumption of the opinion of the small fraction of DGOU members from the neighbouring countries might be biased. Also, more than 60% of the respondents were orthopaedic surgeons, as well as more than 40% had the position of head of department and almost 90% had an experience of more than 10 years.

Conclusion

Despite the up rise of emergency physicians and changes in the training of orthopaedic and general surgeons, it seems that the general surgeon specialized in trauma surgery still plays and wants to play the key role the management of the trauma patient and the fracture care in German-speaking countries.

There seems no desire to change this situation in the future among the members of the DGOU, as the majority of the respondents do not believe that emergency physicians will play a bigger role in the future, although in other scenarios they might be getting more involved in view of an increasing workload in emergency departments.

Interpretation bias might be reduced when including the number of cases treated and with involvement of the other disciplines that are part of the emergency department in a future questionnaire. Moreover, should future research focus on the quality of care and outcome in different health care systems. This pilot study could therefore form the basis for a pan-European study including, for instance, the members of the European Society for Trauma and Emergency Surgery.

Compliance with ethical standards

Conflict of interest Sarah K. Kuhn-Régnier, Michael Stickel, Björn-Christian Link, Henning Fischer, Reto Babst and Frank J. P. Beeres declare that they have no conflict of interest.

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