Questionnaire Survey Of Surgeons In The Netherlands On The Treatment Of Traumatic Thoracolumbar Fractures In Adults.

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Abstract

The treatment of traumatic thoracolumbar fractures in the adult population remains controversial. To create an insight of the treatment performed by spine surgeons in the Netherlands a questionnaire survey was developed. This survey was sent to all departments of trauma-surgery and orthopedic surgery in the Netherlands and focused on their operative- or non-operative treatment of traumatic thoracolumbar fractures in adults. A minority of 32% of the departments offered operative treatment of thoracolumbar fractures. The Magerl/AO classification is still predominantly used among Dutch spine surgeons. The most used stabilization technique is an open dorsal stabilization. A large majority of the departments performs less than 10 operative thoracolumbar spine stabilizations per year. This is the first overview of the treatment of adult patients with thoracolumbar fractures in The Netherlands.

INTRODUCTION

In the Netherlands 3538 patients above 15 years of age presented with spine fractures in 2009. Two hundred and twenty-nine of these patients also had a neurological deficit. The male ratio overall was 50% [1]. There are two main causes involved as far as etiology is concerned. The first cause of the fractures is high energy trauma such as road accidents, industrial related, sports or fall from height. These fractures occur predominantly in young adults. The second cause includes mainly fractures due to osteoporosis, this occurs mostly in elderly women .

In the past most traumatic spine fractures were treated conservatively. In the last decades, due to the development of better implants, education, diagnostics and biomechanical knowledge, a start has been made towards a more precise treatment either conservatively or operatively. The number of surgeons who are able to treat these fractures operatively continues to increase, however clear evidence for a direction of treatment is still small, although growing.

Thus, the treatment of traumatic thoracolumbar fractures in adults is still controversial.

So far no overview of the treatment of this group of patients in the Netherlands has been reported. The aim of our survey on the treatment of traumatic thoracolumbar fractures in adults in the Netherlands among trauma-surgeons and orthopedic surgeons, is to give an overview of the treatment delivered in the Netherlands to traumatic thoracolumbar spine fractures at date.

MATERIAL AND METHODS

A 12-question survey (Table 1) was sent to the departments of trauma surgery and orthopedic surgery of all hospitals in the Netherlands in early 2009 requesting information on the number of treated patients, use of fracture classification, indications for conservative or operative treatment, used operative technique, treatment and time interval in polytrauma patients, treatment of patients with neurologic deficit, and post-operative treatment. We expected that our responders would al be familiar with the AO/Magerl classification and there for used this classification in our survey. The questionnaires were sent to 193 departments.

SPSS 15.0 was used as a data base. Data were analyzed to identify patterns of treatment in traumatic thoracolumbar fractures. Only descriptive data are reported in this study.

RESULTS

Responses were received from 146 departments (76% response rate), including 77 departments of trauma surgery (53%) and 69 department of orthopedic surgery (47%). They

consist of 14 university hospitals departments (9.6%) and 132 general hospitals departments (90.4%).

In 46 (32%) departments operative treatment of thoracolumbar fractures was performed. Nine of these were university departments and 37 general hospital departments. Conservative treatment was the treatment of choice in more than 50% of the adult patients with thoracolumbar fractures in 95% of the responding departments. This was the case in non-operative departments as well as departments who performed surgery.

The fractures were classified using the Denis classification in 19%, Magerl/AO 68%, TLICS 7% and other 4%. In the departments who performed operative treatment the Denis classification was used in 7%, Magerl/AO in 80% and TLICS in 13%.

The number of operative stabilization of thoracolumbar fractures was 10 or less per year in 63% , 10 to 25 operations a year in 30% and more than 25 in 7% of the departments.

Concerning the operative techniques used some departments employed more than one technique. The most used operative technique was the open dorsal stabilization in 50% of the departments, followed by the open dorsal stabilization with bone grafting in 30%. In 4% of the departments a minimal invasive dorsal stabilization was performed. Open ventral stabilization was performed in 30% of the operative active departments versus 11% scopic procedures. In 37% of the operative departments combined ventral and dorsal stabilization procedures were performed.

Operative treatment of thoracolumbar spine fractures related to their AO classification is shown in Table 2. AO fractures type A were treated operatively depending on subtype between 11 and 74%. The B-type fractures in 78% and C-type 80%. A thoracolumbar fracture with a neurological deficit was the only indication for operation in 4% of the departments. Overall 70% of patients with a neurological deficit were treated operatively.

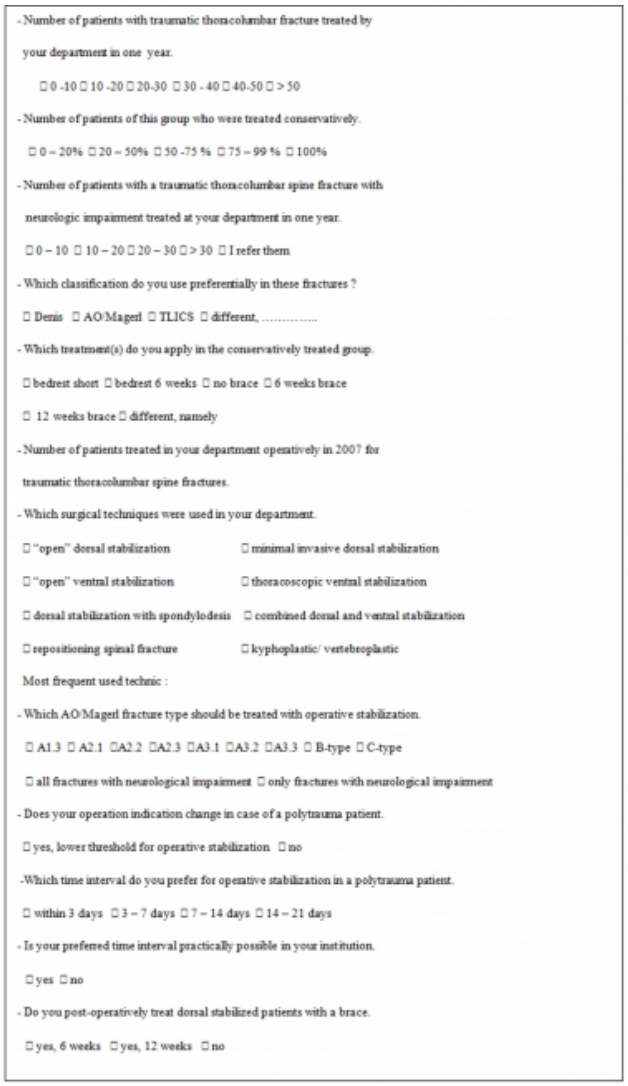
Of the departments 56% treated patients with thoracolumbar fractures and a neurological deficit themselves, 44% transferred the patients with neurological deficit to another hospital. Of the departments which perform operative treatment 74% treated patients with a neurological deficit, 26% of the operative department transferred these patients to another hospital.

In polytrauma patients the threshold for operative stabilization decreased in 56 % of the departments. In 50% of the departments treatment of polytrauma patients was preferably performed within three days, 45% of the departments preferred three to seven days and 5% between seven and fourteen days. In 73% of the departments stabilization of polytrauma patients was logistic possible within planned preferences of time.

After dorsal operative stabilization 48% of patients was treated with an additional brace for six weeks, 26% for 12 weeks and 26% did not use a brace.

Figure 1

Table 1. Survey of the treatment of traumatic thoracolumbar fractures in adults (translated from Dutch).



- Number of patients with traumatic thoracolumbar fracture treated by your department in one year.
  ☐ 0 -10 ☐ 10 -20 ☐ 20-30 ☐ 30 - 40 ☐ 40-50 ☐ > 50
- Number of patients of this group who were treated conservatively.
  ☐ 0 – 20% ☐ 20 – 50% ☐ 50 -75 % ☐ 75 – 99 % ☐ 100%
- Number of patients with a traumatic thoracolumbar spine fracture with neurologic impairment treated at your department in one year.
  ☐ 0 – 10 ☐ 10 – 20 ☐ 20 – 30 ☐ > 30 ☐ I refer them
- Which classification do you use preferentially in these fractures ?
  ☐ Denis ☐ AO/Magerl ☐ TLICS ☐ different, ...
- Which treatment(s) do you apply in the conservatively treated group.
  ☐ bedrest short ☐ bedrest 6 weeks ☐ no brace ☐ 6 weeks brace
  ☐ 12 weeks brace ☐ different, namely
- Number of patients treated in your department operatively in 2007 for traumatic thoracolumbar spine fractures.
- Which surgical techniques were used in your department.
  ☐ "open" dorsal stabilization ☐ minimal invasive dorsal stabilization
  ☐ "open" ventral stabilization ☐ thoracoscopic ventral stabilization
  ☐ dorsal stabilization with spondylodesis ☐ combined dorsal and ventral stabilization
  ☐ repositioning spinal fracture ☐ kyphoplastic/ vertebroplastic
  Most frequent used technic :
- Which AO/Magerl fracture type should be treated with operative stabilization.
  ☐ A1.3 ☐ A2.1 ☐A2.2 ☐A2.3 ☐A3.1 ☐A3.2 ☐A3.3 ☐ B-type ☐ C-type
  ☐ all fractures with neurological impairment ☐ only fractures with neurological impairment
- Does your operation indication change in case of a polytrauma patient.
  ☐ yes, lower threshold for operative stabilization ☐ no
- Which time interval do you prefer for operative stabilization in a polytrauma patient.
  ☐ within 3 days ☐ 3 – 7 days ☐ 7 – 14 days ☐ 14 – 21 days
- Is your preferred time interval practically possible in your institution.
  ☐ yes ☐ no
- Do you post-operatively treat dorsal stabilized patients with a brace.
  ☐ yes, 6 weeks ☐ yes, 12 weeks ☐ no

Figure 2

Table 2: Operative treatment of thoracolumbar spine fractures related to their AO (Magerl) classification

Magerl	AO 1.3	AO 2.2	AO 2.3	AO 3.1	AO 3.2	AO 3.3	B type	C type
percentage	15%	11%	26%	35%	59%	74%	78%	80%

DISCUSSION

The treatment of thoracolumbar spine fractures has evolved the last decades from a solely conservative treatment in all types of fractures and dislocations towards a more differentiated approach. Due to a better understanding of trauma mechanisms with its biomechanical implications, the progress in anesthesiology as well as in surgical techniques, and the development of better implants, more and more patients are treated operatively. However, there are still controversies about the indications for the different types of treatment.

Evidence in favor of one approach over the other for a certain type of fracture in a well defined group of patients is lacking[2,3]. Recently, the Dutch Institute for Healthcare Improvement (CBO) has presented guidelines for the treatment of thoracolumbar spine fractures[4]. To see how much consensus exists about this subject a survey in the Netherlands was performed.

The Dutch healthcare system consists of University Hospitals and General Hospitals. Among them 11 trauma centers each with its own region, most of them as a part of a university medical center. Multiple-injured patients are preferably transferred to the nearest trauma center, which accounts for a difference between the number of patients and the severity of injuries received in the various hospitals. Among trauma surgeons and orthopedic surgeons a large variety with respect to experience in the (operative) treatment of thoracolumbar fractures exists in the Netherlands. In addition, the specialists who are experienced have different opinions concerning the optimal treatment of these type of injuries.

Population-based studies have shown substantial geographic variability in the number of patients treated by operative means. These data primarily reflect elective surgery for degenerative disease and not so much traumatic thoracolumbar fractures [5,6,7,8,9,10,11]. Incidence and prevalence rates of vertebral fractures differ among different countries and regions. Prevalence rate as high as 42.4 per 10.000 and hospitalization incidence from 393 per 100.000 per year are reported[12,13].Reported incidence rates of spine fractures differ from 7.5 till 45 per 100.000 [14,15,16,17].

Daniels et al. showed in their study of a database of the NIS (Nationwide Inpatient Sample), an arthrodesis rate of patients with thoracolumbar fractures without neurologic injury of 9.1% and with neurologic injury of 61.4%[18]. In our study conservative treatment was the treatment of choice in more than 50% of the adult patients with traumatic thoracolumbar fractures in 95% of the responding departments. In case of an accompanying neurologic injury more than 70% of the patients received operative treatment. In the study of Jansson et al. the annual incidence rate of thoracolumbar fractures in Sweden was 30 per 100.000. The overall proportion operated upon was 15%. In a well defined population of 9.2 million adults, this number comes up to about 2700 hospital admissions each year with approximately 400 surgeries[19]. When extrapolated to the Dutch population this would mean that about 700 patients annually would be operated upon. Our survey reveals an operative number of 504 patients in 2007 in the responding departments. This might suggest a slight preference for non-operative treatment among Dutch surgeons.

Concerning the different fracture classifications it is important to know the background of these systems. The classification from Denis is useful for the description of the anatomy of the injury. Magerl et al. made a classification which is based on the trauma mechanism[20]. Vaccaro et al. also looked at the integrity of the posterior ligament and neurological status of the patient (TLICS)[21]. The most widely used classification remains the Magerl/AO classification, although the use of TLICS seems to be gaining ground in the Dutch operative centers.

Operative stabilization of thoracolumbar fractures in adults is performed in a minority of departments. The most commonly used technique is still the open dorsal stabilization. Minimal invasive techniques are performed, but in comparatively small numbers. This is the case for both minimal invasive dorsal approaches ands for ventral approaches.

The indications for operative stabilization when using the Magerl/AO classification were mainly burst (A-3) fractures and B- or C- injuries. The patients who had a neurological deficit were frequently transferred to another department for

operative treatment[22]. Polytrauma patients received a slightly different treatment in the way that they were considered more often for early operative stabilization in just over half of the departments. About 95% of the stabilizations was performed in the first week after injury, this is in concurrence with other studies[23]. Post-operative use of a brace is the case in just under halve of the patients, although the study of Giele et al. showed no benefit from the use of braces[24].

Drawback of the study is that there might be osteoporotic fractures reported as traumatic fracture by the respondents, as is the case in part of the reported literature.

A second drawback is that although there is a very high response, the number of patients reported on by the study can't be matched with the total number of patients in that year reported by Prismant [1].

CONCLUSION

The survey of treatment of adults with a traumatic thoracolumbar fracture among trauma- and orthopedic surgeons in the Netherlands shows a variation in treatment. The Magerl/AO classification is the most widely used among Dutch surgeons. A large majority of patients is treated non-operative. A minority of surgical departments performed operative treatment and those who did performed usually less than 10 stabilizations per year. Open dorsal stabilization was the most commonly used technique. Patients with a neurological deficit were frequently transferred to other hospitals for operative treatment and polytrauma patients had a lower threshold for early stabilization.

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