Traumatic spinal fractures the fall and rise

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PART 1

EPIDEMIOLOGY

CHAPTER 1

INCIDENCE OF TRAUMATIC SPINAL FRACTURES IN THE NETHERLANDS; ANALYSIS OF A NATIONWIDE DATABASE

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Spine (Phila Pa 1976), in press

Abstract

Background

Traumatic spinal fractures may lead to severe disability and have considerable consequences on healthcare capacity and costs. Several studies have reported a large and increasing share of fractures in elderly. Currently, a reliable, detailed and up to date incidence of these injuries in the Netherlands is lacking. These numbers could aid in the composition of preventative measures. This study aimed to fill this lack using nation-wide prospectively registered data.

Methods

A retrospective database study was performed based on prospectively collected data. All patients from 2010 to 2017 that were admitted with a spinal fracture were included. Patients were selected based on Abbreviated Injury Scores (AIS) codes. Collected data consisted of patient- and injury characteristics, afflicted spine-region, associated injury, referral- and discharge location and geographic region of admittance.

Results

Overall 29637 patients were included in this study. The incidence of spinal fractures increased from 2010 to 2017 (from 21,5 to 24,0 per 100.000 inhabitants). Most patients were injured by a (low-energy) fall from the same level followed by (high-energy) traffic accidents. Elderly patients (≥65 years of age) made up 42% of all patients. The proportion of elderly increased significantly faster over the years compared to younger patients. More than half of polytrauma (ISS≥16) patients had fractures in multiple spine regions. 5,5% of all patients suffered spinal cord injury (SCI), most often associated with cervical fractures in polytrauma patients. Regional differences were found mainly in presentation through referral and low and high-energy falls.

Conclusions

The incidence of patients with spinal fractures increased and elderly made up a large part. Preventative measures could be regional dependent and should focus on low-energy falls, traffic accidents and bicycle accidents in specific. In polytraumatized patients there should be special attention for any additional spine fractures and SCI.

Introduction

Traumatic spinal fractures in younger patients are often related to high-energy mechanisms of injury[1-3] and often lead to severe disability and low return to work[4, 5]. In elderly patients however, the etiology of these fractures is mostly low-energetic, such as same level falls[3, 6-10]. It has been reported that elderly patients (≥65 years of age) with a spinal fracture more often need prolonged rehabilitation and are less often discharged home[7, 11], which additionally has its reflection on health care costs. Previous studies have even reported a larger prevalence of spinal fractures in elderly compared to younger patients[3, 6, 8, 10-13]. Epidemiological studies could provide more insight into common causes of these injuries and help compose preventative measures.

The current incidence of spinal fractures in the Netherlands is unknown. Previous studies are outdated and relied on extrapolation and non-scientific databases[10, 14]. Other epidemiological studies are limited to specific spine regions[6, 11, 13, 15] or did not specify spine regions at all[10, 14]. Furthermore, injury-specific details such as mechanism of injury and injury severity scores often lack in other epidemiological literature. As far as we know, up-to-date numbers are also absent for the European countries in proximity to the Netherlands, so the results of this study might be useful for other west-European countries as well.

This study uses a nation-wide prospectively collected database to describe the incidence, characteristics and regional differences of patients with a spinal fracture over an eight-year period. Although the Netherlands is a relatively small country with approximately 17 million inhabitants, large regional differences may exist in terms of traffic, health issues, lifestyle and patient characteristics.

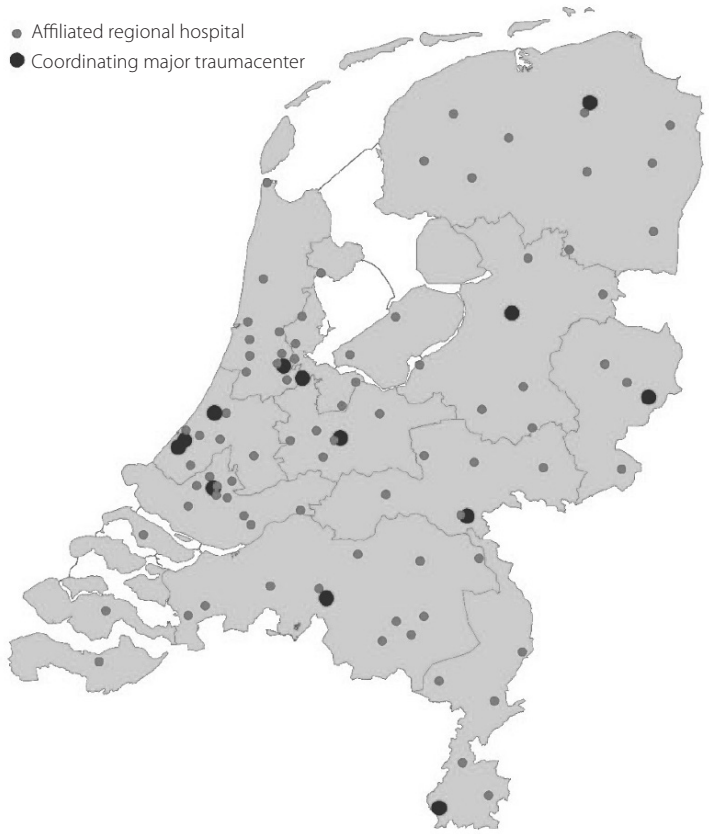
Materials and Methods

National trauma registration

Data for this study was prospectively collected by the Dutch National Trauma Registration (NTR)[16]. This registration was founded in 2007 by the National Network of Acute Care with the aim to improve the acute trauma care. Data is collected regionally by the eleven coordinating level I major trauma centers across the Netherlands. These centers subsequently collect data from smaller regional hospitals (Fig 1). Participation of hospitals in the registration has increased over the years and is currently 99% of all Dutch hospitals (95 out of 96). Every patient that is presented at the emergency department within 48 hours after injury and is admitted to the hospital or deceased on the ED is included in the registration. Trained data managers

enter the data in each hospital. Data is available for research after approval of a request which is submitted through one of the coordinating hospitals.

Fig 1. Distribution of the eleven major trauma centers and its affiliated regional hospitals in the Netherlands



Source: www.lnaz.nl

Patients

All patients included from 2010 to 2017 with a spinal fracture were selected and retrospectively analyzed. Patients were selected based on Abbreviated Injury Score (AIS) codes(17) (version 1998 and 2008) that were applicable at time of injury and which included a spinal fracture (Appendix 1). Patients that did not have one of the abovementioned AIS codes were excluded. Data that was collected consisted of; patient characteristics, spinal fracture region (cervical, thoracic or lumbar), associated injury (AIS per body region), referring institute, mechanism of injury (MoI), MoI date, MoI geographic region, discharge location from emergency department

(ED) and from hospital, injury severity score (ISS), admission duration and ICU admission. To calculate ISS scores, two versions of AIS coding were used. For patients until 2015, AIS version 1998 was used and for patients after 2015 the updated AIS version 2008 was used. MoI was nation-wide registered from 2014 on and was primarily defined in five main categories that concern the setting of accident. Secondary, a more detailed direct cause of injury was reported. A high level fall was defined as two to three times body height. Patients ≥65 years of age were defined as elderly, polytrauma was defined as an ISS≥16 as according to international consensus. Patients were assigned to a spine fracture region if there was at least one fracture in the respective region (cervical, thoracic, lumbar). Spinal cord injury (SCI) was defined based on specific AIS codes (Appendix 2) that correspond with spine region. Patient characteristics, spine fracture region, associated injuries and MoI were stratified for ISS<16 and ≥16.

Incidence

Incidence was calculated using the population numbers for the Netherlands in respective years provided by the central bureau for statistics (CBS)(18). Yearly incidence was corrected for the amount of hospitals that participated in the NTR per year by extrapolation of the absolute incidence to as if there was 100% participation. The formula of correction is reported with table 1.

Table 1. Incidence over the years

Year	Patients	Participation of hospitals in NTR[+]	Population of the Netherlands	Incidence (amount per 100.000 people)	Incidence corrected[#] for hospital participation in NTR
2010	2989	84%	16 574 989	18,0	21.5
2011	3253	89%	16 655 799	19,5	21.9
2012	3615	96%	16 730 348	21,6	22.5
2013	3803	98%	16 779 575	22,7	23.1
2014	3901	99%	16 829 289	23,2	23.4
2015	3943	100%	16 900 726	23,3	23,3
2016	4055	100%	16 979 120	23,9	23,9
2017	4064	99%	17 081 507	23,8	24.0

[+] *Ratio of all hospitals that could possibly participate*
[#] *Correction of Incidence: Incidence/yearly hospital participation(%)*100(%)*
NTR: national trauma registration

Statistics

Normally distributed continuous data were presented as mean with standard deviation. A t-test was used to test differences between two groups with continuous data and ANOVA for three groups or more. Categorical data were reported as absolute values with frequencies or percentages. A Chi-square test was used to test categorical data. Differences in regression coefficients were graphically displayed (Fig 2) and tested with linear regression analysis. P<0,05 was regarded as statistically significant. Analyses were performed with IBM SPSS 24.0.
This study was exempted from ethics review board approval, because the study used coded data from the existing National Trauma Registry and patient anonymity was warranted.

Table 2. Patient characteristics

	Overall	≤ 18 years of age	P⁺	< 65 years of age	≥ 65 years of age	P#
			ISS < 16			
n	21800 (74%)	891 (74%)	-	12068 (70%)	9732 (78%)	-
M:F	1,1:1	1:1	0,7¥	1,6:1	1:1,5	*<0,01*¥*
Mean age	58,7 ± 22,1	14,5 ± 4,0	*<0,01*†*	42,4 ± 15,3	78,9 ± 8,4	*<0,01*†*
ISS (mean, SD)	7,29 ± 3,3	6,6 ± 3,1	*<0,01*†*	7,2 ± 3,3	7,0 ± 3,3	*<0,01*†*
Admission duration	5,7 ± 9,1	3,1± 4,6	*<0,01*†*	4,4 ± 6,4	7,3 ± 11,5	*<0,01*†*
SCI	392 (1,8%)	14 (1,6%)	0.6¥	262 (2,2%)	130 (1,3%)	*<0,01*¥*
			ISS ≥ 16			
n	7837 (26%)	319 (26%)	-	5242 (30%)	2595 (22%)	-
M:F	2,2:1	1,4:1	*<0,01*¥*	2,8:1	1.4:1	*<0,01*¥*
Mean age	52,6 ± 21,1	15,4 ± 3,5	*<0,01*†*	40,9 ± 14,9	76,4 ± 7,8	*<0,01*†*
ISS (mean, SD)	26,1 ± 10,6	29,8 ± 12,6	*<0,01*†*	27,4 ± 10,9	25,6 ± 10,3	*<0,01*†*
Admission days (mean, SD)	16,0 ± 19,1	16,9 ± 27,1	0.5†	17,1 ± 19,9	13,7 ± 17,3	*<0,01*†*
SCI	1241 (15,8%)	50 (15,7%)	0,9¥	854 (16,3%)	387 (14,9%)	0,1¥

SCI: spinal cord injury, SD: standard deviation, ISS: injury severity score, M: male, F: female.
⁺comparing patients ≤ and > 18 years of age; # comparing patients < and ≥ 65 years of age
**statistically significant; †T-test; ¥ Chi²-test.*

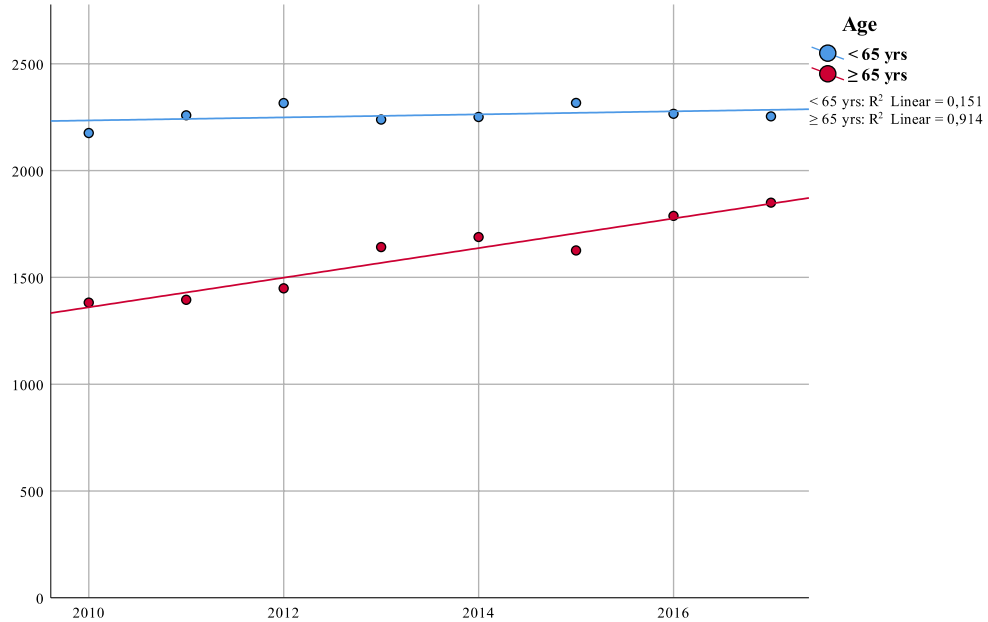
Results

Incidence of traumatic spine fractures increased from 21,5 in 2010 to 24,0 per 100.000 inhabitants in 2017, Table 1.

From 2010 to 2017, 29637 patients were admitted with a spinal fracture to one of the hospitals participating in the NTR. Of these patients, 16603 were male and 13023 were female, a ratio of 1,3:1 (M:F). The ratio of male to female patients increased over the years, with a ratio M:F of 1,16:1 in 2010 and 1,39:1 in 2017. The mean age was 57,1 ± 22,0 years. Forty-two percent of all patients were ≥65 years of age at the time of injury, of which 78,9% had an ISS <16. Additionally, elderly with an ISS<16 were the only group with more females compared males. In total, four percent of patients were aged ≤18. Patient characteristics for specific groups are reported in Table 2 and Figure 3.

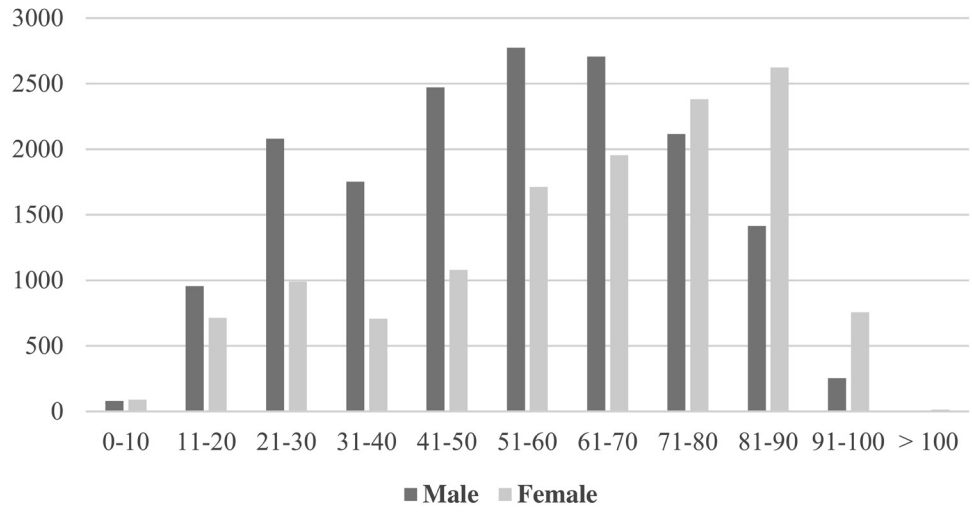
The amount of patients aged ≥65 that suffered a spinal fracture increased significantly faster (linear regression analysis, p<0,01) over the years compared to patients <65 years of age, Figure 2.

Fig 2. Patients with a spinal fracture per year, stratified for age (< and ≥ 65 years) and corrected for hospital participation in NTR per year.



Significant difference (p<0,01) in increase (tested with interaction variable (β = -0.94) in linear regression analysis).

Fig 3. Age and sex distribution of patients presented with a spinal fracture



Spine fracture region

Patients with an ISS<16 suffered mostly lumbar fractures, followed by thoracic and cervical fractures. Polytrauma patients suffered mostly thoracic fractures, followed by cervical and lumbar fractures. The mean ISS was highest for patients with cervical fractures (14,1±11,2), followed by thoracic (14,0 ±10,9) and lumbar fractures (11,9 ±10,4). Characteristics per spine region are reported in Table 3.

In polytrauma patients, more than 50% of the patients with a spine fracture in one region also had a fracture in another region, table 3.

ISS and associated injury

The mean ISS was 12,3 ± 10,7, the mean score for males was significantly higher compared to females (13,8 vs 10,4 respectively, p<0,01, t-test). Associated injury per spine fracture region is shown in Fig 4.

In total, 5,5% of all patients with a spinal fracture had associated SCI and was male (ratio M:F of 2,3:1). The average yearly incidence of SCI corrected for hospital participation in the NTR was 11,6 per million inhabitants. The main causes for SCI were (same and high level) falls, car and bicycle accidents. However, patients injured by shooting, stabbing and motorbike accidents had the highest ratios of SCI (23%, 17% and 11% respectively), Fig 5. In patients with an ISS<16, cervical fractures were most associated with SCI (3,3%), followed by thoracic- and lumbar fractures (both 1,3%). In polytrauma patients, cervical fractures were also most associated with SCI (21,9%), followed by thoracic (15,1%) and lumbar fractures (10,7%). Most patients with SCI were afflicted at the cervical level (56%), table 4.

Table 3. Number of patients with fracture per spine region

	Cervical #	Thoracic #	Lumbar #	p
		ISS < 16		
N⁺	6329 (29%)	7466 (34%)	9798 (45%)	
Age (mean)	60,4 ± 21,5	57,4 ± 22,3	58,4 ± 22,2	*<0,01*†*
Admission (days)	5,3 ± 8,9	5,9 ± 9,7	5,9 ± 8,6	*<0,01*†*
		Associated vertebral fractures		
Cervical #	-	9,1%	1,1%	*<0,01*¥*
Thoracic #	10,7%	-	10,6%	*<0,01*¥*
Lumbar #	1,8%	13,9%	-	*<0,01*¥*
Total patients with additional spine #	12,5%	23,0%	11,7%	
		ISS ≥ 16		
N⁺	3581 (46%)	3987 (51%)	2988 (38%)	
Age (mean)	54,6 ± 21,4	52,6 ± 20,8	50,1 ± 20,4	*<0,01*†*
Admission (days)	16,2 ± 20,1	15,8 ± 17,6	17,5 ± 20,5	*<0,01*†*
		Associated vertebral fractures		
Cervical #	-	33,4%	16,5%	*<0,01*¥*
Thoracic #	37,2%	-	37,9%	*<0,01*¥*
Lumbar #	13,8%	28,4%	-	*<0,01*¥*
Total patients with additional spine #	51,0%	52,2%	54,4%	

*⁺n of regions combined overlaps total number of patients because some patients had multiple fractures. Percentages correspond with ratios of total patients with ISS < 16 and ≥ 16, respectively. #: fracture. *statistically significant; †ANOVA test; ¥ Chi²-test.*

Fig 4. Associated injury per spine region fracture

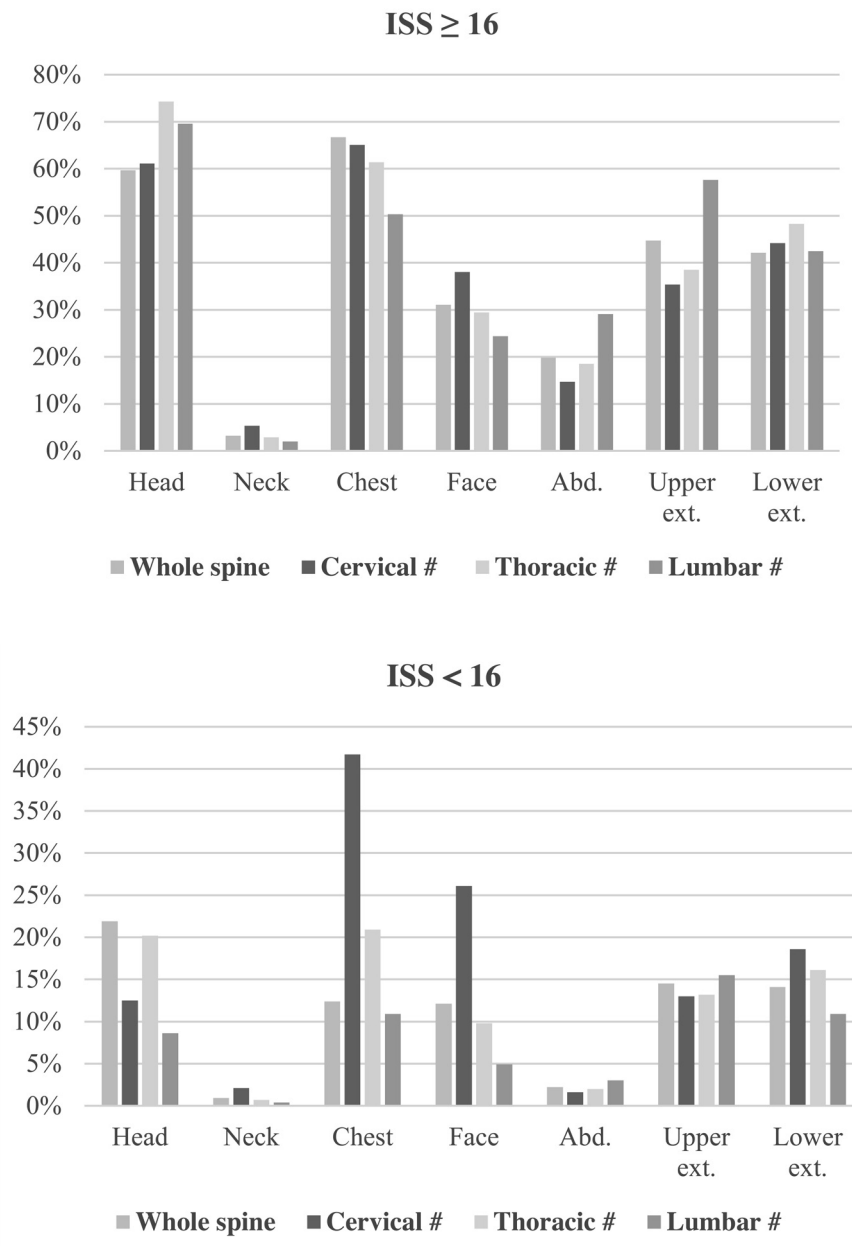
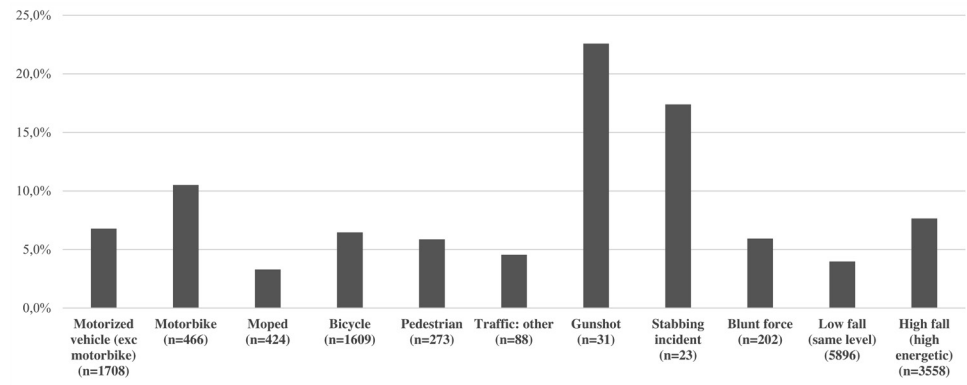


Table 4. Patient characteristics for peripheral neurologic injury

	Cervical level neurology	Thoracic level neurology	Lumbar level neurology	p	SCI total[#]
		ISS < 16			
n	218 (56%)	56 (14%)	119 (30%)	-	392 (100%)
Age (mean)	56,7 ± 20,3	48,2 ± 21,3	52,5 ± 21,2	*0,01*†*	54,1 ± 20.8
Admission (days)	6,2 ± 7,1	6,3 ± 6,0	9,3 ± 10,4	*<0,01*†*	7,2 ± 8.2
		ISS ≥ 16			
n	694 (56%)	379 (31%)	205 (17%)	-	1241 (100%)
Age (mean)	56,3 ± 20,5	48,4 ± 20,8	40,8 ± 18,1	*<0,01*†*	51,4 ± 21,1
Admission (days)	18,0 ± 24,1	20,4 ± 20,2	21,7 ± 33,0	0,1†	19,3 ± 24,9

*[#]n in SCI total is less than regions combined because some patients had neurologic injury on multiple levels and are only counted once in SCI total. *statistically significant; †ANOVA test.*

Fig 5. Ratio's of spine fracture associated SCI per MoI

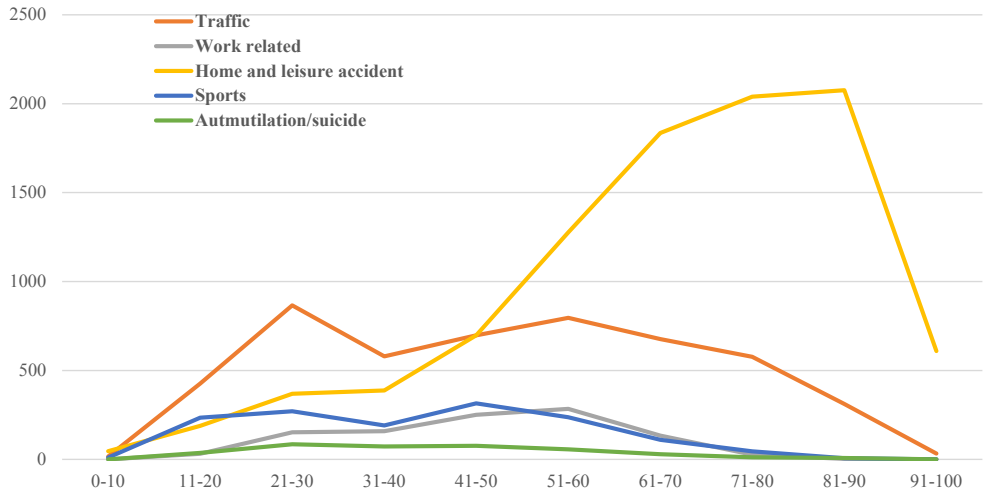


Setting of accident

Setting of accident was reported from 2014 on for 17606 patients. Most patients were injured in a home and leisure accident (54,1%, mean age 67,1±19,1), secondary by a traffic accident (28,3%, mean age 48,8±20,7) and third by sports (8%, mean age 39,6±17,0). Compared to patients with an ISS<16, polytrauma patients were more often injured by traffic accidents. Age distribution for accident setting is shown in Figure 6.

The ratios of accident settings remained stable over the years. Compared to women, men were more often injured by traffic accidents (33,2% vs 21,9%) and work-related accidents (10,1% vs 0,5%). Women were more often injured in a home and leisure accident (67,1% vs 44,1%).

Fig 6. Setting of accident per age group



Mechanism of injury

Specific MoI was also reported from 2014 on, for 14937 patients. Most patients were injured by a fall from the same level (39,5%), a fall from height (23,8%) and by a motorized vehicle traffic accident (11,4%). Of the traffic accidents, car accidents were most common (37,4%), before bicycle- (35,2%) and motorcycle accidents (10,2%). Compared to men, women more often suffered a same-level fall (53,2% vs 29,0%) and less often a high-level fall (19,6% vs 27,1%). Men were more often injured driving a vehicle compared to women (34,0% vs 20,5%), pedestrian injuries for men and women are comparable (1,6% vs 2,1%, respectively)

Patients injured by a low-energy fall were the oldest (67,6 ±20,5) and patients injured by a gunshot were the youngest (33,1 ± 13,0). Younger patients often suffered car accidents and older patients suffered more bicycle accidents. Only 0,5% (151) of all patients suffered a spinal fracture due to penetrating injury. Age distribution of the most common mechanisms of injury are shown in Figure 7a&b.

The ratios of traffic accidents remained stable over the years. MoI stratified for spine region is shown in Figure 8.

Fig 7a&b. Traffic injuries and falls per age group

Fig 7a

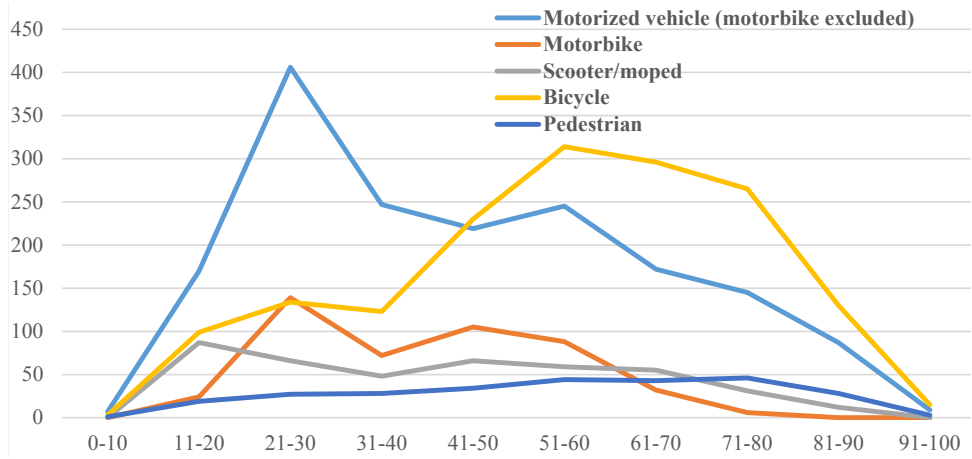


Fig 7b

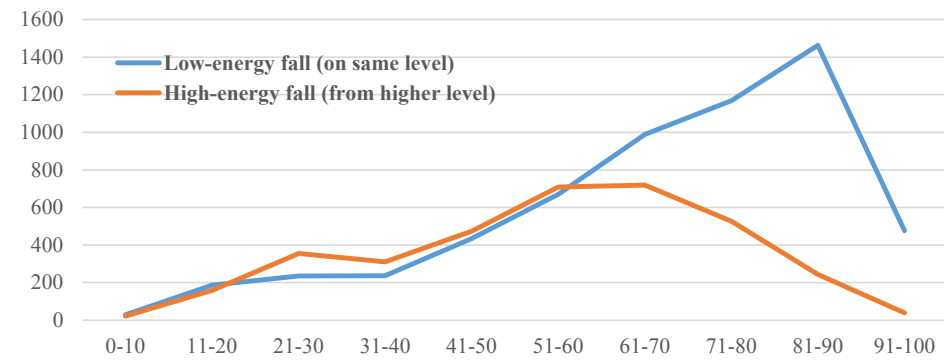
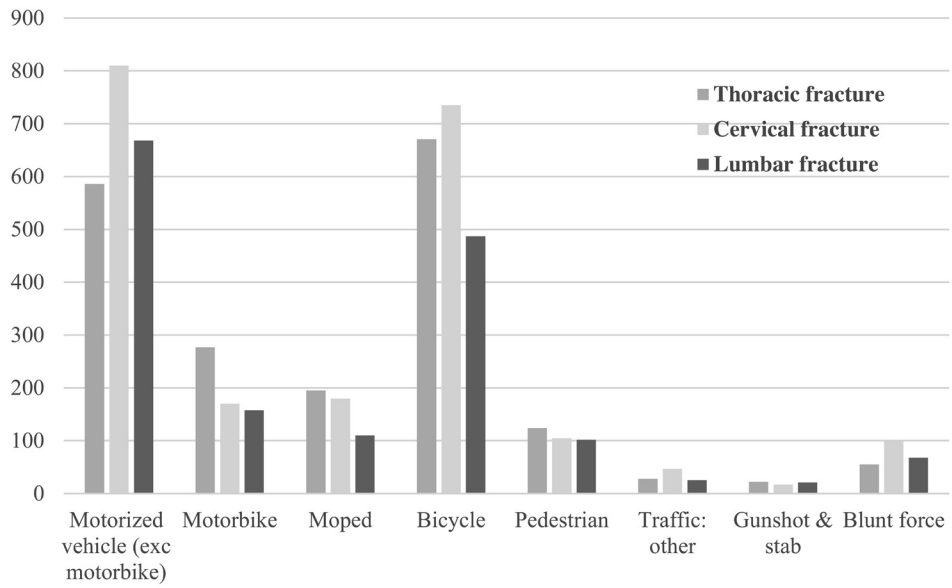


Fig 8. Mechanism of injury stratified for fracture per spine region



Logistics

Transfers after the ED in patients with an ISS<16, consisted in 91,2% of cases to a ward, in 3,9% to the intensive care unit (ICU) and in 0,9% directly to the operating room (OR). Patients with an ISS≥16 were transferred to a ward in 35,2%, to an ICU in 47,0% and immediately to the OR in 11,7%. Transfers after hospital treatment in patients with an ISS<16 were significantly more often to the previous living environment compared to patients with an ISS≥16 (68,4% vs 37,4%, p<0,01, Chi^2-test).

Elderly and Children with spinal fractures

The majority (92,3%) of elderly with an ISS<16 were transferred to a ward after the ED, 3,3% was transferred to an ICU and 0,5% to the OR. They were significantly longer admitted compared to patients <65 years (p<0,01, t-test, table 2).

Of elderly patients that were not living in a nursing home pre-accident, 51,3% was discharged to their previous living environment. Compared to younger patients, mortality of elderly in the emergency room was higher (7,9% vs 2,8%). They were less often injured by traffic accidents (17,3% vs 36,4%) and more often in a home and leisure accident (78,9% vs 35,8%) and by a same level fall (59,1% vs 25,1%).

Compared to older patients (>18 yrs), younger patients (≤18 yrs) were more often injured by traffic accidents (37,5% vs 27,9%) and sports (27,1% vs 7,3%). Specific cause was more often a scooter/moped (9,5% vs 2,6%).

Regional differences

The total number of patients divided over the eleven regions in the Netherlands ranged from 6,1% to 14,5%. The number of patients increased every year in each region. The mean age ranged from 54,9 to 59,3 years, with the proportion of elderly patients ranging from 38,6% to 46,4%. In the eastern regions, patients are more often referred by a general practitioner compared to western regions (average 26,0% vs 13,7%). The largest differences in MoI were in low-energy fall (28,3% (Nijmegen) to 52,7% (Amsterdam)) and high-energy fall (10,3% (Groningen) to 34,6% (Leiden)).

Discussion

This study showed a nationwide increase in incidence of admitted patients with a spinal fracture over a period of eight years. Fractures in elderly patients increased faster over the years compared to younger patients. The incidence of SCI was low and polytrauma patients often suffered fractures in multiple spine regions. The main fracture cause was a same level fall followed by car and bicycle accidents. Regional differences were found in number of patients and MoI.

Incidence and population

The reported incidence (21,5 to 24 per 100.000 inhabitants) is in correspondence with literature from other western countries[6, 9, 12, 19-21] which ranges from 19 to 32 per 100.000 inhabitants. The increasing incidence might be partly due to the increasing elderly population in the Netherlands. Elderly mainly involved women that suffered a same level fall, as has been reported before[6, 9, 10, 12, 14, 19, 22]. These cases are often linked to osteoporosis[10, 14, 22, 23]. Furthermore, the increase could be due to a longer active lifestyle of elderly patients. Additionally, the tendency to perform Computed Tomography with a lower threshold, could lead to increased detection of fractures.

Spine region

Previous studies from several countries[1, 9, 24] reported the highest frequency of lumbar fractures. This is in agreement with our population with an ISS<16, however stratification for ISS revealed that polytrauma patients suffered thoracic fractures the most. It seems that in these

high energy traumas, the rigid ribcage does not provide enough protection. Furthermore, more than half of polytrauma patients with a spine fracture in one region had a fracture in another region. This finding marks the importance of (radiologic) whole-spine examination in polytrauma patients with a spinal fracture. It has to be noted though that fractures may also include clinically less significant fractures such as processus transversus fractures.

Fracture associated SCI incidence (11,6 per million) is in accordance with previous Dutch studies (11,7 to 14,5)[14, 25] and Finland[9], but varies around the world[26]. This is partly explained by the direct relation of SCI and MoI (e.g. shooting, stabbing) and prevalence thereof in other areas[2]. Although the prevalence of spine fracture associated SCI is low, clinicians should especially be aware of symptoms in polytraumatized patients with cervical fractures and in patients with spinal injury due to shooting, stabbing or motorbike accidents.

Mechanism of injury

Men were more often injured by traffic accidents and work-related causes compared to women, this might be explained by different traffic behavior and differences in type of work. While cyclists are rooted in Dutch traffic, they are vulnerable traffic participants and bicycle accidents caused 35% of all traffic related spine fractures. In recent years the use of electronic bicycles (e-bikes) has increased rapidly[27] and is possibly partially responsible for the spine fracture increase. The peak age of cyclists in our population was 50-70 years (Fig 7A), an age group that is especially attracted to e-bikes and in which additional vulnerability has been reported on e-bikes[28, 29]. In other countries, an increase in e-bike use has also been reported[30-32] with associated higher risk of spine fractures in patients over 50 years of age[32]. Furthermore, e-bike accidents often consist of a single vehicle crash[27, 30].

Logistics

Elderly with an ISS<16 were almost three days longer admitted after a spinal fracture compared to younger patients. Moreover, they were more often discharged to a nursing home than younger patients which confirms previous findings[7]. Combined with the increasing frequency of elderly with a spine fracture, this could be a serious concern for future health care cost control[22].

Regional differences

Regional numbers overall seem fairly comparable. An interesting finding though was that patients with a spinal fracture in east Netherlands were more likely to visit a GP first before going to the hospital. This could be due to differences in registration rates but also to larger distances to hospitals or a different mindset. The largest regional differences were found in same level and high level falls. One explanation for low-energy falls could be that in more

densely populated areas (e.g. Amsterdam) more elderly live on a storey which increases the risk of slipping or falling from stairs. This is however only hypothetical and we have not found this difference described before.

Strengths and limitations

This study relied on the largest nationwide database that systematically collected data in almost all Dutch hospitals over several years. The data registration has been proven reliable[33] and is not merely an estimation. Another strength is the use of AIS codes instead of ICD codes, whereas AIS codes are more detailed and assigned after thorough inspection of a patient file. While the database only registers patients admitted or deceased in the ED and does not register patients that were not admitted or declared dead on scene, the data will probably show a small underestimation of the actual incidence of spine fractures. At the start of the NTR in 2007 there were large fluctuations in participation rates while towards 2017 nearly all national hospitals participated. The exact registration rate per hospital was however not known to the authors and could have caused (especially regional) differences. Another limitation is the change in AIS version in 2015. Missing data mainly consisted of random missings and was therefore unlikely to cause selection bias. Due to the already large number of variables and patients it was chosen not to report missing values.

Conclusions

There was an increasing incidence of spinal fractures, with peaks of car accidents in younger men and same level falls in elderly women. Additionally, there were a considerable amount of bicycle accidents, with a peak among 50-70 year olds. Preventative measures should be considered on regional levels while differences in mechanism of injury were found. In polytraumatized patients there should be specific attention for additional spine fractures in different regions. Incidence of SCI was low and most common among polytraumatized with a cervical fracture.

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AIS codes spinal fracture and region		
Cervical fracture	Thoracic fracture	Lumbar fracture
6402043	6404043	6306063
6402083	6404083	6306103
6402144	6404144	6306243
6402184	6404184	6306283
6402245	6404245	6306344
6402285	6404285	6306384
6402326	6404465	6406043
6402366	6404505	6406083
6402465	6404645	6406144
6402505	6404685	6406184
6402645	6504162	6406245
6402685	6504172	6406285
6402726	6504182	6406465
6402766	6504202	6406505
6502162	6504222	6406645
6502172	6504242	6406685
6502182	6504262	6506162
6502202	6504302	6506172
6502222	6504322	6506182
6502242	6504343	6506202
6502262		6506222
6502283		6506242
6502302		6506262
6502322		6506302
6502343		6506322
		6506343

AIS codes spinal cord injury per spine region		
Cervical SCI	Thoracic SCI	Lumbar SCI
6302022	6304022	6306003
6302042	6304042	6306023
6302062	6304062	6306043
6302083	6304083	6306063
6302102	6304102	6306083
6302122	6304122	6306103
6302142	6304143	6306122
6302162	6304992	6306143
6302203	6404003	6306203
6302214	6404013	6306223
6302223	6404023	6306243
6302243	6404043	6306263
6302263	6404063	6306283
6302274	6404083	6306304
6302602	6404104	6306324
6302622	6404124	6306344
6302642	6404144	6306364
6302663	6404164	6306384
6302992	6404184	6306602
6402003	6404205	6306622
6402013	6404225	6306642
6402023	6404245	6306663
6402043	6404265	6306682
6402063	6404285	6306992
6402083	6404405	6406003
6402104	6404425	6406013
6402124	6404445	6406023
6402144	6404465	6406043
6402164	6404485	6406063
6402184	6404505	6406083
6402205	6404605	6406104
6402215	6404625	6406124
6402225	6404645	6406144
6402245	6404665	6406164
6402265	6404685	6406184
6402285	6504033	6406205
6402296		6406225
6402306		6406245
6402326		6406265
6402346		6406285
6402366		6406405
6402405		6406425
6402425		6406445
6402445		6406465
6402465		6406485
6402485		6406505
6402505		6406605
6402605		6406625
6402615		6406645
6402625		6406665
6402645		6406685
6402665		6506033
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