

Characteristics of cervical spine injury in the aged society. the aging rate: > 33.3%

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Introduction

Japan is one of the most aged countries in the world; the aging rate is **25.1% in 2016**. The health care zone that our hospital is in charge is becoming more aged; the aging rate was already **33.3% in 2010**.

We have many opportunities to treat the cervical spine injuries (CSIs). The patients of CSIs are gradually increasing.

Therefore, to investigate the CSIs in our hospital is useful to predict the trend and characteristics of the CSIs in the aged society.

Purpose

To investigate the CSIs in our hospital, we performed two studies, as follows;

- 1) To analyze the incidence of CSIs in our society
- 2) To analyze the characteristics of CSI patients who were aged **80 years and over**

Masuda City



Location:

West end of Shimane Pref. in Japan

Northwest of Hiroshima

Population:

48,000 (in 2016)

- decreasing year by year

Aging rate:

33.3% (in 2010) \longrightarrow 35.4% (in 2016)

- increasing year by year

- higher than Japan (25.1% in 2016)



Patients

85 patients with CSIs were treated in admission to our hospital conservatively or surgically between Jan. 2009 ~Sept. 2016.

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- <Exclusion criteria>
- Paralysis: Frankel grade E at injury
 - Initial treatment was performed in other hospital

68 patients were evaluated retrospectively.

Gender: 47 males, 21 females

Age: mean 73.5 yrs (26 ~ 96)

Methods

Study 1: To analyze the trend of incidence of CSIs, patients were divided into two groups (as follows), and we compared the details between the two groups.

- the former group: Jan. 2009 ~ Dec. 2012
- the latter group: Jan. 2013 ~ Sept. 2016

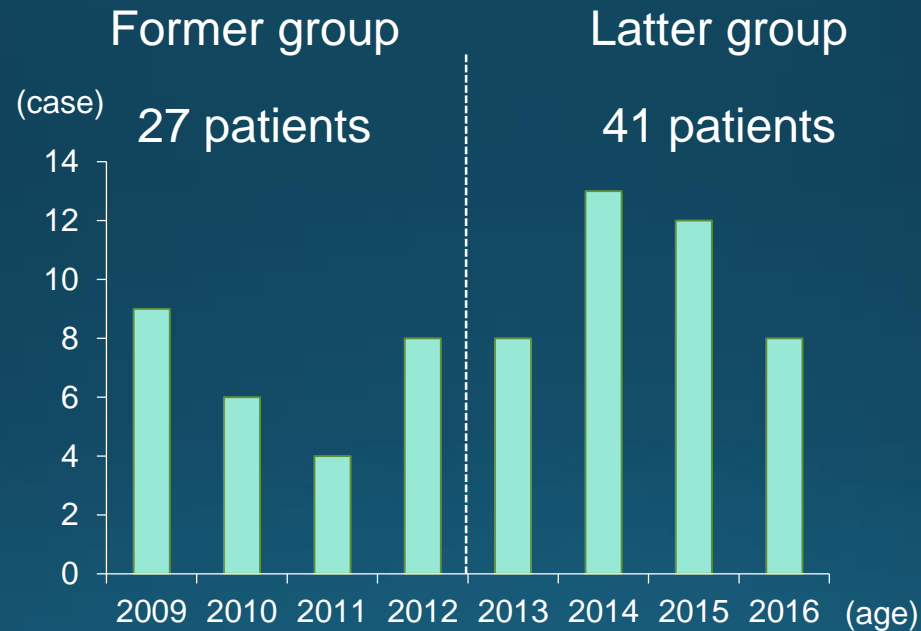
Study 2: To reveal the characteristics of CSIs who were 80 years and older, patients were divided into two groups (as follows) and we compared the two groups.

- the Group A: 80 years and over
- the Group B: below 80 years

Results

Study 1: To analyze the trend of incidence of CSIs

<Figure 1>



Aging rate

33.3%



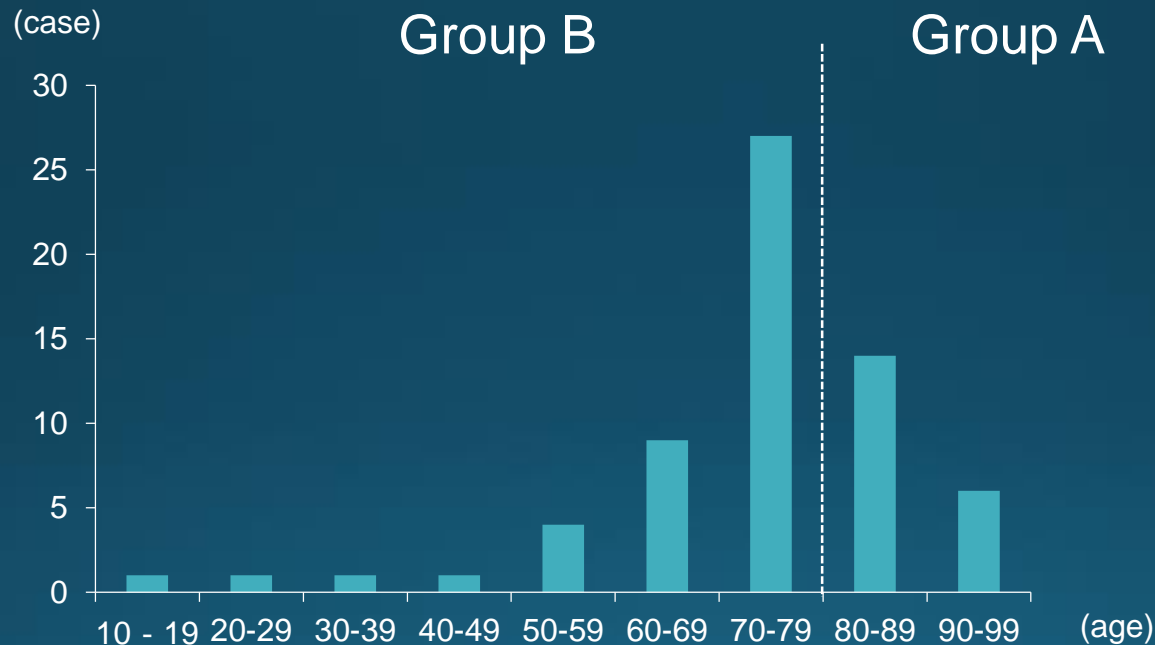
35.4%

- There was no significant difference between the two groups.
- According to the increase of the aging rate, CSI patients in the latter group was 1.5 times more than the former group.

Results

Study 2: To analyze the characteristics of CSIs in elderly

<Figure 2>



- This distribution of CSIs showed **one peak at 70-79 ages**.

<Table 1> Differences between Group A and B

		Group A	Group B	p-value
Number		18	49	-
Age mean (range)		87.1 (80-96)	68.6 (26-79)	0.036
Gender male : female		10:9	37:12	ns
Injury level (C1/C2/C3/C4/C5/C6/C7)		0/1/1/6/5/3/2	1/1/2/4/28/9/ 5	ns
Injury mechanism	Falling from height	10	20	ns
	Fall on the ground	8	18	
	Traffic accident	0	7	
	others	0	5	
Bony injury (with /without)		8/10	21/29	ns
Comorbidity (including duplications)	circulation	4	10	ns
	pulmonary	1	2	
	malignancy	4	4	
	others	6	17	
Frankel grade (A/B/C/D/E)	at injury	8/3/2/5/-	3/13/11/22/-	0.046
	final follow-up	2/3/3/5/-	4/3/3/25/15	-
Improvement case of paralysis (at least 1 grade of Frankel grade)		3	26	0.038
Mortality case within 6 months		5	0	0.025

(Mann-Whitney' U test, chi-square test were employed)

Frankel A at injury in Group A was significantly more than Group B.

Improvement of paralysis in Group A were poorer than Group B.

There were 5 mortality cases in Group A, none in Group B.

<Table 2> Details of mortality cases in Group A

case	Age, gender	Injury	Injury mechanism	Injury level	Frankel grade (injury)	Reason for death	Duration from injury
1	80, M	OPLL, w/o fx	falling from height	C4	A	gastric ulcer	1 months
2	93, M	C2 dislocation & fx	falling from height	C2	A	pneumonia	1 day
3	86, M	w/o fx	falling on the ground	C6	A	pneumonia	6 months
4	83, M	C6 dislocation	falling from height	C6	A	pneumonia	6 months
5	81, F	Distractive extension stage 2	falling from height	C3	A	respiratory insufficiency	1 month

(M: males, F: females, w/o: without, fx: fracture)

- Mortality cases in Group A were caused by falling from height, and had severe paralysis at injury (all cases were graded at Frankel A).

Discussions

● Incidence of CSI

Shingu H, Paraplesia 1998 (the aging rate: unknown)

- 2 peaks at 20 years-old and 59 years-old
- 25.4% of spinal cord injuries are 65 years and over



88% of these cases were CSIs.

- Incidence of spinal cord injury:
40.2 cases /1 million /year.

Our results (the aging rate: >33.3%)

- Only 1 peak at 70-80 years
- 57 out of 68 cases (83.8%) were 65 years and over
- 19 out of 68 cases (27.9%) were 80 years and over

- Incidence of CSI:
185 cases /1 million /year.

Incidence of CSI in the aged society have been increasing, compered with the previous report.

- Poor recovery from CSI

Alander DH, Spine 1997 (the aging rate: unknown)

If patients were older than 50 years old,

complete CSIs → no recovery

incomplete CSIs → required to ambulate with aids

77% of complete CSIs were died within 1 year

- Poor recovery of CSI treatment

HHS public Access, J Am Geriatr Soc. 2015

Mortality rate at 1 year: 41.7% in CSIs > 22.7% in hip fx

Our study revealed that CSIs' patients in the elderly had the tendency of severe paralysis at injury, poor recovery from paralysis, and high mortality, just same as previous reports.

Conclusions

- In the more aged society (the aging rate: $>33.3\%$), the incidence of CSIs of the elderlies is increasing.
- The injury mechanisms of CSIs in the elderly were consisted of high energy injuries, such as falling from height and traffic accidents, as same as those in the young patients.
- CSIs' patients in the elderly had the tendency of severe paralysis at injury, poor recovery from paralysis, and high mortality.

Disclosure of Conflict of Interest

- We have no COI with regard to our presentation.