

JOURNAL READING

報告者：R1許力云
指導者：VS侯勝文
2010/08/17

CASE

+ 45歲男性工人從三層樓高的鷹架跌落，右側有5根肋骨骨折，頭皮上有hematoma，但brain CT沒有ICH,到ER時的SpO2 = 92%，其餘vital signs正常，病患覺得右後背痛，但不太會喘

CLINICAL ISSUE

1. 肋骨骨折需要住院嗎？是斷超過幾根以上需要住院？還是要合併什麼傷勢才要住院？台灣健保有住院條件嗎？
2. 肋骨骨折數目的多寡（或單純有無肋骨骨折）跟病患的mortality有關嗎？跟morbidity有關嗎？有沒有其他的交互作用因子？（例如年紀）

SEARCH DATABASE

+ Pubmed(limit Human)

Keyword :

Rib fractures 2519

Rib fractures + patient admission 29

Rib fractures + length of stay(LOS) 66 ,

Rib fractures + Injury Severity Score(ISS) 102

Rib fractures + LOS + ISS 39

Rib fractures + mortality 278

+ Cochrane review

Keyword : Rib fractures 33

+ Google

Keyword : 肋骨 骨折 健保 住院

SEARCH RESULT

- 1) Perils of Rib Fractures. Am Surg. 2008;74(4):310-4.
- 2) Rib fractures: Relationship with pneumonia and mortality. Crit Care Med. 2006 Jun;34(6):1642-6.
- 3) Half-a-dozen ribs: The breakpoint for mortality. Surgery. 2005 Oct;138(4):717-23; discussion 723-5.
- 4) Rib Fractures in the Elderly: A Marker of Injury Severity. J Am Geriatr Soc. 2004;52(5):805-8.
- 5) Chest injury due to blunt trauma. European Journal of Cardio-thoracic Surgery 23 (2003) 374-378.
- 6) A comprehensive analysis of traumatic rib fractures: morbidity, mortality and management. Eur J Cardiothorac Surg 2003;24:133-138.
- 7) Morbidity from Rib Fractures Increases after Age 45. J Am Coll Surg. 2003 Apr;196(4):549-55.
- 8) Management of patients with multiple rib fractures. Am J Crit Care. 2001 Sep;10(5):320-7; quiz 328-9.
- 9) Rib fractures in the elderly. J Trauma. 2000 Jun;48(6):1040-6; discussion 1046-7.
- 10) Three or more rib fractures as an indicator for transfer to a Level I trauma center: a population-based study. J Trauma. 1990 Jun;30(6):689-94.
- 11) Presence of three or more rib fractures as an indicator of need for interhospital transfer. J Trauma. 1989 Jun;29(6):795-9; discussion 799-800.
- 12) 外科臨床問題證據醫學資料共享：肋骨骨折病人住院天數。中區健保局

**ISSUE1 : 肋骨骨折需要住院嗎？
是斷超過幾根以上需要住院？還
是要合併什麼傷勢才要住院？台
灣健保有住院條件嗎？**

- + When comparing patients with 1-2 rib fractures versus **3 or more rib fractures**, significant differences were found in **mortality**, mean **Injury Severity Score**, mean **hospital stay** and mean **number of ICU days** (p less than 0.001). The significant differences occurred in all age groups 14 years old and older.
- + The presence of **3 or more rib fractures** identifies a small subgroup of patients (2.4%) likely to **require tertiary care**. This triage tool is useful in all patients **over the age of 14 years**.

Lee RB, et al. Three or more rib fractures as an indicator for transfer to a Level I trauma center: a population-based study. *J Trauma*. 1990 Jun;30(6):689-94.

- + We defined **need for interhospital transfer (NIT)** based on the following: death, an Injury Severity Score of greater than or equal to 16, or direct admission to the operating room or intensive care unit. We conclude that the presence of **three or more rib fractures** identified a group of patients **requiring transfer to a trauma center** (positive predictive value = 92.8%). A population-based study is needed to verify this finding.

Lee RB, et al. Presence of three or more rib fractures as an indicator of need for interhospital transfer. *J Trauma*. 1989 Jun;29(6):795-9; discussion 799-800.

- + Patients with **isolated rib fractures** should be **hospitalized** if the number of fractured ribs is **three or more**. We also advocate that **elderly** patients with **six or more** fractured ribs should be treated in **intensive care units** due to high morbidity and mortality.

Mehmet Sirmali, et al. A comprehensive analysis of traumatic rib fractures: morbidity, mortality and management *European Journal of Cardio-thoracic Surgery* 24 (2003) 133-138

TABLE 2. Analysis of Rib Fractures in All Age Groups

Rib Fractures	Age Groups	N	Age	ISS	GCS	RTS	LOS	Mortality
1 to 2	<18	25	13.1	22.1	13.4	7.1	4.2	16%
	18-64	265	39.4	15.2	13.6	7.5	7.2	3%
	≥65	118	78.9	12.8	14.3	7.6	7.7	8%
3 to 5	<18	19	13.0	31.8	9.3	6.1	7.7	21%
	18-64	210	39.1	24.3	12.8	7.3	9.2	11%
	≥65	97	76.9	20.2	13.7	7.3	9.6	25%
≥6	<18	2	7.1	19.0	15.0	7.6	4.5	0%
	18-64	47	41.7	40.0	9.9	5.5	12.0	32%
	≥65	25	79.4	27.1	12.4	6.7	6.0	49%
All Ribs	<18	46	12.4	26.0	11.6	6.7	6.2	17%
	18-64	522	39.5	21.1	13.0	7.2	8.6	9%
	≥65	240	78.1	17.1	13.8	7.4	8.3	18%
No fractures*	All ages	808	43.1	23.6	12.7	7.2	7.9	12%
	All ages	667	32.8	17.3	12.5	7.0	6.6	11%

Sharma et al. *Am Surg*. 2008 Apr;74(4):310-4.
Perils of Rib Fractures

- + Factors indicating a high-risk RF include **high-energy trauma**, **extremes of age**, **≥ 3 RF**, **associated injuries**, and **ISS ≥ 15**. All patients with RF should be carefully evaluated and higher-risk patients admitted for close observation and treatment.

Sharma et al. *Am Surg*. 2008 Apr;74(4):310-4.
Perils of Rib Fractures

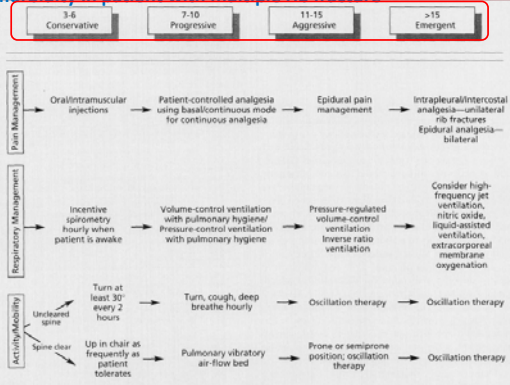
Table for rapid calculation of rib fracture score used in patient management protocol

$$\text{Rib fracture score} = (\text{Breaks} \times \text{Sides}) + \text{Age factor}$$

Breaks	Number of fractures
Sides	Unilateral = 1, bilateral = 2
Age factor	
0	If <50 years old
1	If 51-60 years old
2	If 61-70 years old
3	If 71-80 years old
4	If >80 years old

Anna Easter, Management of patients with multiple rib fractures
Am J Crit Care. 2001 Sep;10(5):320-7; quiz 328-9.

Protocol for management of pain, respiratory care, and morbidity in patient with multiple rib fracture



Anna Easter. Management of patients with multiple rib fractures
Am J Crit Care. 2001 Sep;10(5):320-7; quiz 328-9.

健保局建議

建議：

- 肋骨骨折，如病人年紀大、病人有心肺疾病、骨折數目3根或大於3根、伴隨有其他合併症(如連枷胸)、住進ICU、使用呼吸器，會有較長的住院天數。

www.nhi.gov.tw

結論

- + Elderly
- + Number of rib fractures (more than 3)
- + Rib fracture score
- + high-energy trauma
- + associated injuries
- + ISS (≥ 15)

考慮進一步評估，以及收治住院

ISSUE 2 : 肋骨骨折數目的多寡 (或單純有無肋骨骨折) 跟病患的MORTALITY有關嗎? 跟MORBIDITY有關嗎? 有沒有其他的交互作用因子? (例如年紀)

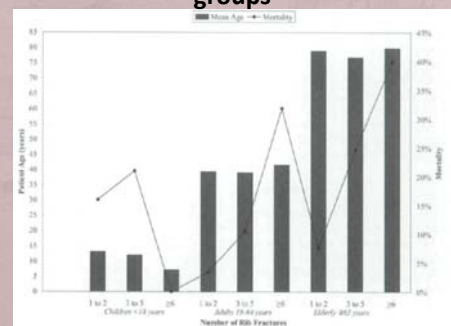
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	18-64	265	39.4	15.2	13.6	7.5	7.5	35%
	≥ 65	118	78.9	12.8	14.3	7.6	7.7	85%
3 to 5	<18	19	12.0	31.8	9.3	6.1	7.7	21%
	18-64	210	39.1	24.3	12.8	7.3	9.5	119%
	≥ 65	97	76.9	20.2	13.7	7.3	9.6	25%
≥ 6	<18	2	7.1	19.0	15.0	7.6	5.5	0%
	18-64	47	41.7	40.0	9.9	5.5	12.0	32%
	≥ 65	25	79.8	27.1	12.4	6.7	6.0	40%
All Ribs	<18	46	12.4	26.0	11.6	6.7	6.2	17%
	18-64	522	39.5	21.1	13.0	7.2	8.6	9%
	≥ 65	340	78.1	17.1	13.8	7.4	8.3	18%
No fractures*	All ages	808	43.1	23.6	12.7	7.2	7.9	12%
	All ages	667	32.8	17.3	12.5	7.0	6.6	11%

injury severity score (ISS), revised trauma score (RTS), Glasgow coma scale (GCS) score critical-care and hospital length of stay (LOS)

Sharma et al. Am Surg. 2008 Apr;74(4):310-4.
Perils of Rib Fractures

Mortality by Number of Rib Fractures In all age-groups



Sharma et al. Am Surg. 2008 Apr;74(4):310-4.
Perils of Rib Fractures

Table 1. Mortality by Age and Number of Rib Fractures

Age	Number of Rib Fractures				Total
	1-2	3-4	5-6	7	
<65	6.1	7.6	16.2	23.3	11.4
>65	12.3	11.2	28.1	37.8	20.1
Total	7.9	8.8	20.3	27.9	14.1

P = .001.

Stawicki et al. Rib Fractures in the Elderly: A Marker of Injury Severity
J Am Geriatr Soc. 2004 May;52(5):805-8.

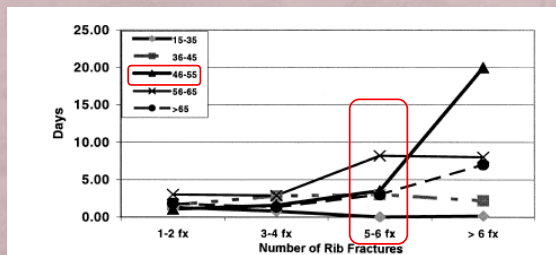
- + Achieving better results in the treatment of patients with chest wall injury depend on a variety of factors. The **risk of mortality** was associated with the presence of **more than two rib fractures**, with patients **over the age of 60 years** and with an **ISS greater than or equal to 16** in chest trauma. Those patients at high risk for morbidity and mortality and the suitable approach methods for them should be acknowledged.

Serife et al. Chest injury due to blunt trauma
European Journal of Cardio-thoracic Surgery 23 (2003) 374-378

- + Patients **over the age of 45** with more than **four rib fractures** are more **severely injured** and at increased risk of adverse outcomes.

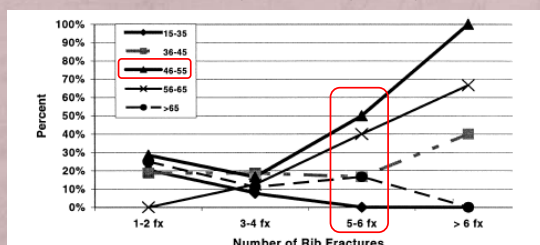
Holcomb et al. Morbidity from Rib Fractures Increases after Age 45
J Am Coll Surg. 2003 Apr;196(4):549-55.

The effect of the number of rib fractures (fx) and age on the number of ventilator days.



Holcomb et al. Morbidity from Rib Fractures Increases after Age 45
J Am Coll Surg. 2003 Apr;196(4):549-55.

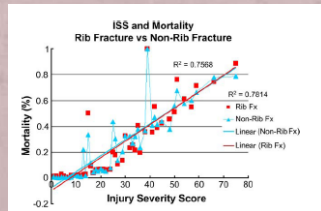
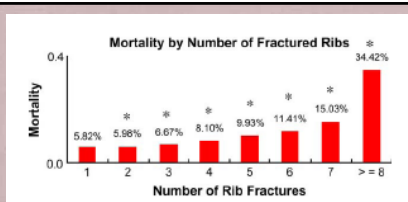
The effect of the number of rib fractures (fx) and age on the number of pulmonary complications.



Holcomb et al. Morbidity from Rib Fractures Increases after Age 45
J Am Coll Surg. 2003 Apr;196(4):549-55.

- + In a model controlling for multiple known risk factors, **age** and **Injury Severity Score** were the only important predictors of **mortality** in patients with **rib fractures** and **multiple system injury**.
- + **Pneumonia** was significantly **associated with mortality** only in patients with **isolated thoracic trauma**.

Brasel KJ et al. Rib fractures: relationship with pneumonia and mortality.
Crit Care Med. 2006 Jun;34(6):1642-6.



Fligel BT et al. Half-a-dozen ribs: the breakpoint for mortality. *Surgery*. 2005 Oct;138(4):717-23; discussion 723-5.

結論

- + ISS 越高
 - + Rib fractures 越多根
 - + Elderly (45以上)
 - + Comorbidity 越多
- 有越高的Mortality
- + Pneumonia 的有無，只和isolated thoracic trauma的mortality有關

**THANKS FOR YOUR
ATTENTION**