

Journal Reading: EBM

Speaker: R1 游姿寧
 Supervisor: VS 侯勝文
 2010/08/17

Scenario

- 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。

臨床問題

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）

文獻搜尋

The screenshot shows a computer browser window displaying the UpToDate online medical reference. The URL in the address bar is http://www.uptodate.com/online/content/topic.aspx?topicKey=med_10000&topicId=10000. The page title is "Rib fractures". The search bar at the top contains the query "rib fractures". Below the search bar, there is a "New Search Help" box with the text: "You may search on a single term, or on multiple terms at the same time. e.g. Treatment of hypertension in children." The page footer includes copyright information: "© 2010 UpToDate, Inc. All rights reserved." and "Licensed to: Nils Kong Wu Ho Yu Merv Hoip".

文獻搜尋

The screenshot shows a computer browser window displaying the UpToDate online medical reference. The URL in the address bar is http://www.uptodate.com/online/content/topic.aspx?topicKey=med_10000&topicId=10000. The page title is "Rib fractures". The search bar at the top contains the query "rib fractures". The page displays author information: Kristine A Karlson, MD; Section Editors: Patrice Giff, MD, John A Marx, MD; and Deputy Editor: Jonathan Grayzel, MD, FFAEM. The page also includes a "Print Options" section with checkboxes for Text, References, and Graphics. The bottom of the page provides a brief introduction to rib fractures, mentioning they are common injuries following blunt thoracic trauma and can result from severe coughing, athletic activities, and nonaccidental trauma. It notes complications like pneumothorax, splenic laceration, and pneumonia.

summary

- 3 groups of ribs:
 - Superior (1-3): protected by scapula, clavicle, soft tissue
 - Middle (4-10): most susceptible to injury
 - Inferior (11-12): floating rib
- Mechanism of rib fracture
 - Direct trauma: blunt or penetrating
 - Traumatic fracture: at the site of impact or the posterolateral bend
 - Pathologic fracture: prostate, breast and renal cancer
 - Stress fractures: severe cough, athletes
 - Child abuse

summary

- Symptom/signs
 - Local pain
 - Severe point tenderness
 - Bony crepitance
 - Ecchymosis
 - Diminished breath sounds: due to pain, pneumothorax, pulmonary contusion

summary

Fracture in ribs 1-3	Extrapulmonary internal injury Mediastinal injury (esp. aorta)	
4-9		Intrathoracic injury, e.g. pneumothorax, pulmonary contusion
10-12	Intraabdominal injury	

Flail chest

- ≥ 3 adjacent ribs, each fractured in 2 places
- Paradoxical motion in respiration

Treatment of rib fracture

- Pain control!
 - NSAID, opioids
 - Intercostal nerve blocks, epidural blocks, transcutaneous electrical nerve stimulation (TENS)
- Treat the complication
- Admission
 - Any patient with ≥ 3 rib fractures
 - Elderly patients with ≥ 6 rib fractures → ICU
- Evidence level: Evidence Guideline, level V (?)

文献搜尋

PubMed search results for "rib fracture mortality".

Results: 1 to 20 of 52

1. Factors associated with survival following blunt chest trauma in older patients: results from a large regional trauma cooperative.

Harrington DT, Phillips B, Machan J, Zacharias N, Velmahos GC, Rosenblatt MS, Winston E, Patterson L, Desjardins S, Winchell R, Brotsman S, Churyla A, et al. Ann Thorac Surg. 2009 Sep;88(3):803-10. PMID: 19699118 [PubMed - indexed for MEDLINE]

文献搜尋

PubMed search results for "rib fracture mortality".

1. Postresuscitative clinical features in the first hour after achieving sustained ROSC predict the duration of survival in children with non-traumatic out-of-hospital cardiac arrest.

Lin YR, Li CJ, Wu TK, Chang YJ, Lai SC, Liu TA, Hsieh MH, Chou CC, Chang CF. Resuscitation. 2010 Apr;81(4):410-7. Epub 2010 Feb 10. PMID: 20149114 [PubMed - indexed for MEDLINE]

2. Epidemiology of major paediatric chest trauma.

Samarasinha SP, Mikocka-Walus A, But W, Cameron P. J Pediatr Child Health. 2009 Nov;45(11):878-80. Epub 2009 Oct 19. PMID: 19845438 [PubMed - indexed for MEDLINE]

3. Risk factors for 24-hour mortality after traumatic rib fractures owing to motor vehicle accidents: a nationwide population-based study.

Lien YC, Chen CH, Lin HC. Ann Thorac Surg. 2009 Oct;88(4):1124-30. PMID: 19845438 [PubMed - indexed for MEDLINE]

4. A randomized controlled trial of bupivacaine through intracostal catheters for pain management after thoracotomy.

Allen MS, Haugen L, Nichols FC 3rd, Casavit SD, Harmsen WS, Wigle DA, Shen KR, Deschamps C. Ann Thorac Surg. 2009 Sep;88(3):803-10. PMID: 19699118 [PubMed - indexed for MEDLINE]

Paper 1

Ann Thorac Surg. 2009 Oct;88(4):1124-30.

Risk factors for 24-hour mortality after traumatic rib fractures owing to motor vehicle accidents: a nationwide population-based study.

Lien YC, Chen GH, Lin HC.

Division of Thoracic Surgery, Department of Surgery, Taipei Medical University and Hospital, Taipei, Taiwan.

- methods:

- 18856 patients hospitalized with rib fractures after TA; 2002-2004; data from Taiwan's National Health Insurance Research Database
- multivariate logistic regression
- 24-hr mortality, patients' age, sex, comorbid conditions, hospital characteristics

Results

Variables	Totals		Deceased Within 24 Hours		p Value
	No.	Column %	No.	Row %	
Patient characteristics					
Patient sex	13,217	70.1	311	2.4	0.923
Male	9,039	20.9	134	2.4	0.923
Female	4,178	79.1	277	77.6	
Patients' age (y)					
16-44	5,207	26.1	90	1.7	0.217
45-64	8,470	44.9	181	1.6	0.309
65-74	3,239	17.2	95	2.9	0.140
≥75	1,444	9.8	99	5.6	0.745
Hospital characteristics					
Hospital level	3,938	20.9	99	2.5	0.001
Medical center	3,938	20.9	99	2.5	0.001
Regional hospital	6,883	47.1	249	2.8	0.634
District hospital	6,056	32.0	97	1.6	0.938
Hospital ownership					
Public	4,005	21.2	94	2.4	0.911
Private not-for-profit	7,340	38.9	183	2.5	0.755
Private for-profit	7,511	38.8	168	2.2	0.207
Hospital location					
Northern	5,579	29.6	120	2.2	0.459
Central	6,045	32.1	163	2.7	0.882
Southern	6,739	35.7	190	2.2	0.589
Eastern	493	2.6	12	2.4	0.481

Conclusion

- ≥ 6 rib fracture, heart injuries, hepatic injuries, head injuries, and advanced age are the most important determinants of 24-hr mortality after thoracic trauma from TA.
- Evidence level: III

Paper 2

Eur J Cardiothorac Surg. 2003 Jul;24(1):133-8.

A comprehensive analysis of traumatic rib fractures: morbidity, mortality and management.

Sırmalı M, Türüt H, Topcu S, Gühan E, Yazıcı U, Kaya S, Taştepe I.

Department of Thoracic Surgery, Atatürk Training and Research Hospital for Chest Disease and Chest Surgery, Ankara, Turkey. mehmetsi@mail@yahoo.com

- methods

- between 1999-2001

- 1417 patients with thoracic trauma

Results

Table 1
Occurrence of pulmonary complications associated with the types of trauma

	Pneumothorax	Hemothorax	Hemo-pneumothorax	Lung contusion	Flail chest	Isolated subcutaneous emphysema
Motor vehicle	93	69	30	57	18	2
Falls	44	24	15	26	1	6
Assault	20	13	10	6	1	4
Industrial accidents	14	10	7	5	6	

Table 2
Association between the types of the traumas, pulmonary complications and median injury severity score (ISS)

	Pneumothorax	Hemothorax	Hemo-pneumothorax	Lung contusion	Flail chest	Isolated subcutaneous emphysema
Motor vehicle	16	17	17	19	26	12
Falls	13	14	13	15	23	10
Assault	12	12	11	12	19	9
Industrial accidents	15	16	17	18	25	

Results

Table 3
Relationship between the ages and pulmonary complications of the cases

Age group	Pneumothorax	Hemothorax	Hemo-pneumothorax	Lung contusion	Flail chest	Isolated subcutaneous emphysema
Child (n = 68)	14	8	7	21	—	1
Adolescent (n = 103)	40	28	16	23	—	2
Adult (n = 235)	92	79	37	32	18	6
B elderly (n = 142)	58	32	24	18	14	3
Total (n = 548)	204	147	84	94	32	12

Table 4
Relationship between the number of fractured ribs and number of pulmonary complications of the cases

No. of fractured ribs	Pneumothorax	Hemothorax	Hemo-pneumothorax	Lung contusion	Flail chest	Isolated subcutaneous emphysema
1-2	34	25	7	15	—	9
3-5	67	45	25	32	12	3
6 or more ↓	103	77	42	47	20	—
Total	204	147	74	94	32	12

Conclusions

- The greater the number of fractured ribs, the higher the mortality and morbidity rates.
- ≥ 3 rib fractures: admission to general ward
- Elderly with ≥ 6 rib fractures: ICU
- Evidence level: III**

Paper 3

Surgery. 2005 Oct;136(4):717-23; discussion 723-5.

Half-a-dozen ribs: the breakpoint for mortality.

Flagel BT, Luchette FA, Reed RL, Esposito TJ, Davis KA, Santaniello JM, Gamelli RL.

Division of Trauma, Critical Care, and Burns, Department of Surgery, Burn Shock Trauma Institute, Stritch School of Medicine, Loyola University Medical Center, Maywood, Illinois, USA.

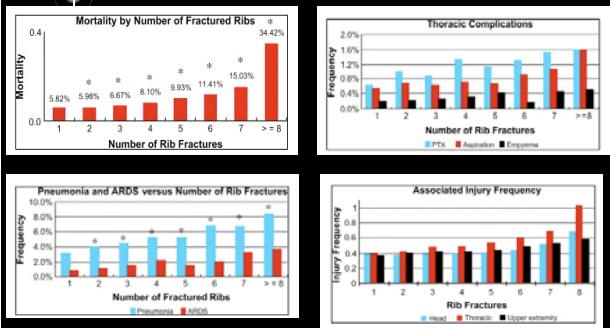
• methods

- the National Trauma Data Bank (NTDB)
- 731823 patients with at least 1 rib fracture
- to analyze: the number of rib fractures, injury severity score, pneumonia, ARDS, PE, pneumothorax, aspiration pneumonia, empyema, the need for ventilator....

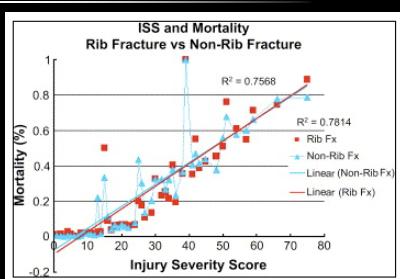
Results

ICD-9 code			AIS code			Either ICD-9 or AIS code				
No. of rib fractures	No. of cases	Total	Mortality	No. of rib fractures (grouped)	No. of cases	Total	Mortality	No. of cases	Total	Mortality
1	15,613	24.15%	5.82%	1	10,651	22.35%	5.82%	16,001	23.80%	5.74%
2	9,784	15.13%	5.98%							
3	7,482	11.57%	6.67%	2-3	18,484	38.78%	7.90%	23,980	35.67%	7.46%
4	4,784	7.40%	8.10%	4-6	8,709	13.54%	12.081	17.97%	11.73%	
5	2,824	4.37%	9.93%							
6	1,771	2.74%	11.41%							
7	1,114	1.72%	16.03%							
≥ 8	1,994	3.08%	34.42%	≥ 8	1,729	3.63%	42.36%	2,738	4.07%	32.96%
Unspecified	19,295	29.84%	14.65%	Unspecified	8,085	18.96%	19.24%	12,421	18.48%	18.03%
Totals	64,681	100.00%	10.12%	Totals	47,658	100.00%	11.64%	67,221	100.00%	10.79%

Results

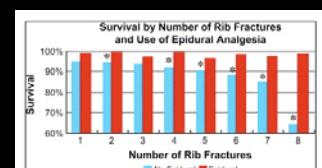


Results



Mortality was not effected by the rib fracture alone.

Results



Conclusion

- Mean hospital length of stay (LOS): 7 days, ICU LOS: 4 days
- Increasing the number of rib fractures correlated directly with increasing pulmonary morbidity and mortality.
- ≥ 6 rib fractures \rightarrow significant risk for death from causes unrelated to the rib fractures.
- Epidural analgesia: reduce the mortality for all patients (esp. > 4 rib fractures)
- Evidence III

Paper 4

J Trauma, 2000 Jun;48(6):1046-6; discussion 1046-7.

Rib fractures in the elderly.

Bulger EM, Amesom MA, Mock CN, Jurkovich GJ.

Haborview Medical Center, Seattle, Washington 98104-2499, USA. ebulger@u.washington.edu

- A retrospective cohort study
- 277 patients, ≥ 65 y/o with rib fractures
- Control: 187 patients, 18-64 y/o with rib fractures
- Outcomes: pulmonary complications, number of ventilator days, length of ICU and hospital stay (LOS), mortality...

Results

	≥ 65 y/o	18-64 y/o
Mean number of rib fracture	3.6	4
Mean chest abbreviated injury score	3	3
Mean injury severity score	20.7	21.4
Mean number of ventilator days	4.3	3.1
ICU days	6.1	4.0
LOS	15.4	10.7
pneumonia	31 %	17 % ($p < 0.01$)
mortality	22 %	10 % ($p < 0.01$)

Results

- The mortality rate in patients with LOS > 2 days:

	Use epidural analgesia	Did NOT use
≥ 65 y/o	10 %	16 %
18-64 y/o	0 %	5 %

Conclusions

- Elderly: twice the mortality and thoracic morbidity
- $\uparrow 1$ rib fracture in the elderly, $\uparrow 19\%$ mortality and $\uparrow 27\%$ risk of pneumonia
- Evidence level: III

健保相關規定

Google 搜尋結果

健保 助骨骨折

[200] [助骨骨折病人住院天數]

... 總共有 2,380 筆結果 (搜尋時間: 0:16 秒)

... Microsoft Word - HTML 版

... 助骨骨折病人應該住多長才合理？根據中區做個案統計，發現：... 希望建立助骨骨折 病人之治療準則，尤其是助骨骨折病人住院天數資料，並提供相關文獻供參考；... www.mohw.tw/Jattach/9243_1/外科/助骨骨折病人住院天數.doc... 雜誌內容

... 中央健康保險局-醫療機構-醫療服務

... 助骨骨折 病人住院天數...pdf (格式:PDF 頁面視圖) ... 小學生有必要割包皮嗎？... 地址：台北市大安區106號信義路三段140號總機電話：02-27065886 健保諮詢服務專線：0800-... www.mohw.gov.tw/Jattach/9243_1/外科/助骨骨折病人住院天數.doc... 雜誌內容

* 請從更多來自 www.mohw.gov.tw 的結果

只加健保或自費 助骨骨折病人 討論不休... 醫林迴響...udn部落格

... 2009年9月22日... 開縣的鄉願在於... 痘人要住住院... 外科醫師認為不符合健保規定，要求自費入院；後來發現助骨骨折... 痘人趕快炒開... 要求退費，雙方談不攜而離開。如此而已... blog.udn.com/wangkwo/3339099... 頁庫存檔

在健保局的虛擬諮詢下... 果然問題出... 從巨頭頂的水族箱遠望大海...udn部落格

... 否則... 應某些報導說的？兩位... 讓健保 核刪下來... 自費的病房差額都超過五百元... 一... 楊洋池表示... 林志玲 助骨骨折部位融合良好，可以下床走動，不需要坐輪椅，也不必... blog.udn.com/wangkwo/37759... 頁庫存檔

行政院衛生署花蓮醫院 >> 健理科 >> 最新訊息

... 助骨骨折助骨骨折 是常發生的胸部外傷，常見於跌倒、交通事故或緊急煞車撞到方向盤所致... 其... 建祐健保 複原率比較資料(另開視窗) 建祐中央健康保險局(另開視窗) ... www.hwh.doh.gov.tw/... 衡衡資訊... 健理科... 頁庫存檔

穴位治療- 胸線部位疼痛- 助間神經痛- 助骨骨折- 胸管術後- 健康-... 美麗...

健保相關規定

- 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
- 一般肋骨骨折，在一星期後，有fibrous union形成，疼痛較容易控制
- 急性期可使用oral NSAID，IV Keto或PCA治療

健保相關規定

主診斷代碼	資料	單純性肋骨骨折		肋骨骨折合併其他動脈	
		非交通事故	總計	交通事故	總計
80701	個案數	10	25	35	50
	平均天數	3.4	3.2	3.3	4.1
80701	個案數	5	25	30	39
	平均天數	3.2	2.7	2.8	4.4
80701	個案數	5	12	17	43
	平均天數	4.2	3.7	3.8	4.7
80701	個案數	3	10	13	25
	平均天數	5.3	3.6	4	6.4
80701	個案數	2	7	9	31
	平均天數	3.5	5	4.7	6.3
80701	個案數	1	4	5	8
	平均天數	4	5	4.8	4.9
80701	個案數	1	1	1	4
	平均天數	4	4	15	8.75
80701	個案數			2	8
	平均天數			16	13.1
80701	個案數	2	2	4	33
	平均天數	5.5	5.5	8.5	12.9
加總個案數的加總		26	86	112	538
平均健全性病床天數的加總		3.8	3.5	3.5	6.1
					750

Grading for recommendations

- Admission duration: 3.5-6.1 days
- Use the number of rib fracture, patient's age and concurrent injury (i.e. heart, liver, head) to predict the morbidity and mortality
- Use epidural analgesia to reduce the mortality
- Clinical recommendation: group C

Thank you for your attention!