Journal meeting

Reporter: PGY 江明璇
Supervisor: VS 侯勝文
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EMERGENCY MEDICAL SERVICES/BRIEF RESEARCH REPORT

Randomized Controlled Trial of a Scoring Aid to Improve GCS Scoring by EMS Providers

Amanda Feldman, BS; Kimberly W. Hart, MA; Christopher J. Lindsell, PhD; Jason T. McMullan, MD*

Annals of Emergency Medicine, 2014; 1-5

背景

- GCS score(1974): ❶描述意識狀態❷預測預後(包含院外病人)
  - 扮演角色: 初步(initial)及進行性(ongoing) 評估
- EMS(Emergency Medical Service)
  - 關於EMS人員評估GCS score的精確度之相關文獻有限
  - 院外---低施測者間信度(interrater reliability)

研究目的

- 評估EMS人員對GCS score的評分正確度
- 探討是否可藉由GCS scoring aid來改善評分正確度(accuracy)
- 假設(hypothesis):若能有輔助方式，可以增加GCS score快速且精準評估，就可增加評分之正確度

方法

- 研究設計: randomized controlled study
- 受測者選擇: a urban, academic Level I trauma center急診
  → 緊急救護技術員(technicians),
  高級緊急救護技術員(paramedics)
- 量測方法: 隨機分配9個標準化的情境題目之一(scenario), 隨機給予/不給予scoring table aid
  - scenario由急診專科醫師,EMS, 神經重症照護醫師取得共識答案
  - 受測者需回答E, V, M score 及total score
- 量測結果分析: primary outcome:受測者答案的正確率
  secondary outcome:與正確答案相差±1分的人次, E,V,M 分別的正確率,3級TBI(traumatic brain injury)的正確率
- 統計方法: χ^2 test, student's *t* test

Mild	13-15
Moderate	9-12
Severe	3-8

Table E1. Patient scenarios randomly provided to on-duty EMS providers for GCS scoring, with the correct component and composite scores for each.

		Eye	Verbal	Motor	Total
Severe TBI					
7	You respond to a 22-y-old woman who was pushed down the stairs during a fight with her boyfriend. She fell down 12 wooden steps and landed on the cement basement floor. She is bleeding from the nose and mouth and has an obvious deformity to her left wrist. She will briefly open her eyes to a sternal rub, and her pupils are normal-sized and sluggishly reactive to light. She tries to pull away when you pinch her shoulder and mumbles something you cannot understand, but settles when you stop applying stimulation.	2	2	4	8
8	You respond to a motorcycle accident in which an unhelmeted rider hit a car that unexpectedly pulled out of a parking lot. He is found lying supine in the road 20 feet from the site of impact. Initially, you notice that he has irregular, snoring respirations and has obvious trauma to his head, face, and right leg. He is unresponsive and does not open his eyes to a deep sternal rub. You pull his eyelids open and discover that his left pupil is 2 mm larger than his right. Other than noisy respirations, he makes no sounds at any time. When you apply a sternal rub, his arms pull into his chest and his legs straighten out.	1	1	3	5
9	You respond to an 18-y-old man who fell out of a tree and landed on his head. He is briskly bleeding from his scalp but has no other obvious injuries. His only response to a deep sternal rub is to moan and groan. On your secondary examination, you find that his pupils are equal, dilated, and sluggishly reactive to light. There are several empty beer bottles at the base of the tree, and there is a strong odor of alcohol on his breath.	1	2	1	4

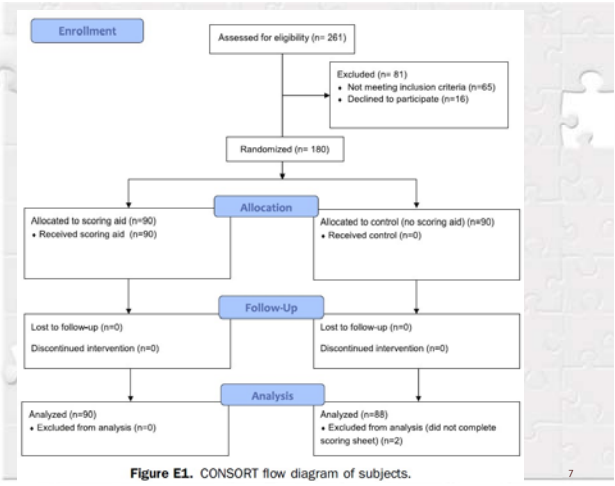


Figure E1. CONSORT flow diagram of subjects.

結果

Table 1. Participant characteristics.

	No Table Aid (n=88)		Table Aid (N=90)		Total (n=178)	
Age, mean (SD), y	37	(10)	36	(9)	36	(9)
Race, No. (%)						
White	72	(81.8)	76	(84.4)	148	(83.1)
Black	15	(17.0)	11	(12.2)	26	(14.5)
American Indian/Alaskan Native	0	(0)	2	(2.2)	2	(1.1)
Other	1	(1.1)	0	(0)	1	(0.6)
Asian/Pacific Islander	0	(0)	1	(1.1)	1	(0.6)
Male, No. (%)	80	(90.9)	77	(85.6)	157	(88.2)
Level of EMS certification, No. (%)						
EMT-basic	44	(50.0)	39	(43.3)	83	(46.9)
EMT-intermediate	2	(2.3)	0	(0)	2	(1.1)
Paramedic	42	(47.7)	51	(56.7)	93	(52.0)
Years of experience, mean (SD)	12	(8)	11	(7)	12	(8)
Refreshed on GCS material within the past year, No. (%)	58	(65.9)	67	(74.4)	125	(70.2)
EMS instructor, No. (%)	6	(6.8)	7	(7.8)	13	(7.8)
Use aid to determine the GCS in the field, No. (%)	54	(61.4)	45	(50.0)	99	(56%)

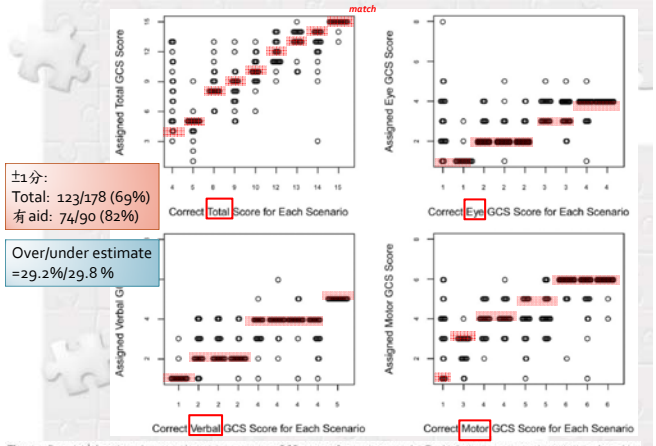
*Through course/recertification/training

結果

Table 2. Scoring of patient scenarios by EMS providers.*

	Total (n=178)		No Table Aid (n=88)		Table Aid (n=90)			95% CI	
	No.	%	No.	%	No.	%	% Difference	Lower	Upper
All GCS scenarios									
Total	73	(41.0)	22	(25.0)	51	(56.7)	31.9	18.3	45.6
Eye	110	(61.8)	38	(43.2)	72	(80.0)	37.3	24.1	50.5
Verbal	125	(70.2)	48	(54.5)	77	(85.6)	31.6	19.0	44.3
Motor	90	(50.6)	27	(30.7)	63	(70.0)	39.7	26.2	53.1
Mild TBI scenarios (GCS score 13–15)									
Total	32	(54.2)	13	(44.8)	19	(63.3)	14.3	−6.1	34.6
Eye	41	(69.5)	16	(55.2)	25	(83.3)	18.5	−6.5	43.5
Verbal	47	(79.7)	21	(72.4)	26	(86.7)	28.2	5.7	50.6
Motor	44	(74.6)	17	(58.6)	27	(90.0)	29.3	6.1	52.5
Moderate TBI scenarios (GCS score 9–12)									
Total	17	(28.8)	3	(10.3)	14	(46.7)	31.4	10.5	52.3
Eye	37	(62.7)	12	(41.4)	25	(83.3)	34.9	13.1	56.8
Verbal	41	(69.5)	15	(51.7)	26	(86.7)	36.3	15.3	57.3
Motor	21	(35.6)	6	(20.7)	15	(50.0)	40.0	17.4	62.6
Severe TBI scenarios (GCS score 3–8)									
Total	24	(40.0)	6	(20.0)	18	(60.0)	40.0	16.9	63.1
Eye	32	(53.3)	10	(33.3)	22	(73.3)	42.0	19.6	64.3
Verbal	37	(61.7)	12	(40.0)	25	(83.3)	43.3	21.3	65.4
Motor	25	(41.7)	4	(13.3)	21	(70.0)	56.7	36.2	77.1

match



±1分:
Total: 123/178 (69%)
有 aid: 74/90 (82%)

Over/under estimate
=29.2%/29.8 %

Figure. Dot plot of assigned composite and component GCS scores for each scenario. Each circle represents the score assigned by a single respondent.

結論

- 59% EMS受測者對GCS score評估不精準
  - ➔使用GCS scoring aid可以改善評估GCS score的正確率(57% versus 25%)
- 臨床意義:對於EMS人員,即使給予評分表格協助,GCS scoring正確率仍低(57%),進而減低了神經系統評估的價值

討論

- 藉由scoring table確實可改善評分正確率(超過2倍---57%:25%),但整體來說仍低(41%)
  - GCS太複雜(complex), 不完美(imperfect)
  - 但臨床照護上仍被廣為接受且使用
  - GCS被取代之前,須加強評分的正確率(accuracy)
    - 此篇study為第一篇證實可以增加scoring的正確率的研究

討論

- 在給予scoring table協助之下,多數(82%)都在1分差之內
  - 本研究中,1分的差異是可接受的
  - 其他真實狀況:1分的差異
  - ➔可能造成檢傷分類的不同，和考慮插管與否

討論

- 有學者認為不需GCS,只需採用M score即可
  - M score與存活率呈線性相關；且可評估插管病患
    - *Improving the Glasgow Coma Scale score: motor score alone is a better predictor J. Trauma 2003;54*
  - 本研究在motor score的評估正確率最低(50.6%)
- 替代評估方法
  - FOUR score
    - *Validation of a New Coma Scale: The FOUR Score Annals of Neurol 2005;58*
    - Eye, motor, brainstem reflex, respiration
  - Emergency Coma Scale
    - *A simple and useful coma scale for patients with neurologic emergencies: the Emergency Coma Scale Am J Emerg Med. 2011;29*

討論

- 研究之限制(limitations)
  - 實用性:本研究為紙本敘述的scenario,若為評估真實病人,可獲得更多病人資訊
  - 公平性:沒有記錄到是否有受測者使用自己的scoring aid (即使現場並無觀察到有人有此作為)
  - 誤差:[scoring aid組]有可能有人並未使用本研究所提供的scoring table輔助作答

11 questions to help you make sense of a trial

How to use this appraisal tool

Three broad issues need to be considered when appraising the report of a randomised controlled trial:

- **Are the results of the trial valid?** **(Section A)**
- **What are the results?** **(Section B)**
- **Will the results help locally?** **(Section C)**

The 11 questions on the following pages are designed to help you think about these issues systematically.
The first three questions are screening questions and can be answered quickly. If the answer to both is "yes", it is worth proceeding with the remaining questions.

There is some degree of overlap between the questions, you are asked to record a "yes", "no" or "can't tell" to most of the questions. A number of prompts are given after each question. These are designed to remind you why the question is important. Record your reasons for your answers in the spaces provided.

(A) Are the results of the review valid?

Screening Questions

1. Did the trial address a clearly focused issue? ☑ Yes ☐ Can't tell ☐ No

HINT: An issue can be 'focused' in terms of
- The population studied
- The intervention given
- The comparator given
- The outcomes considered

- Ans:
  - ❶population: 都市一級創傷中心的急診--緊急救護技術員(technicians)及高級緊急救護技術員(paramedics)
  - ❷intervention:給予GCS scoring table協助
  - ❸comparator given: 不給予GCS scoring table協助
  - ❹outcome:使用GCS scoring table協助，可改善評分之正確性(accuracy)
    - ➲ 57%: 25%

2. Was the assignment of patients to treatments randomised? ☐ Yes ☑ Can't tell ☐ No

HINT: Consider
- How was this carried out?
- Was the allocation sequence concealed from researchers and patients?

- Ans: 研究方法(method of measurement)
  - ❶題目(scenario)-有/無scoring table: 放進信封中，受測者會被隨機指定回答其中一題 ➔ 並未說明擇題的隨機方法為何。
  - ❷allocation sequence: 實驗組與對照組為隨機對半分(90-90); 分組後無採用blinding method

3. Were all of the patients who entered the trial properly accounted for at its conclusion? ☑ Yes ☐ Can't tell ☐ No

HINT: Consider
- Was the trial stopped early?
- Were patients analysed in the groups to which they were randomised?

Ans: ❶Trial 並無提早結束
❷實驗組與對照組為隨機對半分(90-90): 對照組中有2人未完成試題

4. Were patients, health workers and study personnel 'blind' to treatment? ☐ Yes ☐ Can't tell ☑ No

HINT: Think about
- Patients?
- Health workers?
- Study personnel?

Ans: ❶受測者: not blind ---「給予scoring table」無法blind
❷研究人員: not blind

5. Were the groups similar at the start of the trial? ☑ Yes ☐ Can't tell ☐ No

HINT: Look at
- Other factors that might affect the outcome such as age, sex, social class

Ans:
研究共歷時2個月(2013/04-06), 受測者年齡無改變; 工作經驗無差異

6. Aside from the experimental intervention, were the groups treated equally? ☑ Yes ☐ Can't tell ☐ No

Ans:
除了在實驗組有「給予scoring aid table」的差別之外，控制組的其他條件都相同。

(B) What are the results?

7. How large was the treatment effect?

HINT: Consider
- What outcomes were measured?
- Is the primary outcome clearly specified?
- What results were found for each outcome?

Ans:
❶outcome評估項目: 受測者答案的正確率; 3級TBI的正確率; ±1分的人次
❷outcome結果也有清楚的由表格及數據來客觀呈現
❸

Outcome		accuracy	有aid: 無aid
Primary		41%	57% : 25%
secondary	Mild TBI	54.2%	63% : 45%
	Moderate TBI	28.8%	47% : 10%
	Severe TBI	40.0%	60% : 20%

±1分:
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8. How precise was the estimate of the treatment effect?

HINT: Consider
- What are the confidence limits?

Ans: 95%信賴區間(CI; Confidence interval)
❶All scenario, moderate, severe TBI : 「使用aid table與否」有顯著差異
❷mild TBI (total score, eye score): 「使用aid table與否」無顯著差異

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Motor	25	(41.7)	4	(13.3)	21	(70.0)	56.7	36.2	77.1

(C) Will the results help locally?

9. Can the results be applied in your context? (or to the local population?) ☐ Yes ☑ Can't tell ☐ No

HINT: Consider whether
- Do you think that the patients covered by the trial are similar enough to the patients to whom you will apply this?, if not how to they differ?

EMT (Emergency Medical Technician)
EMT-P (Emergency Medical Technician-Paramedic)

Ans:
❶本研究的受測者為來自41個EMS機構(包含鄉村/城市, 民間單位/義消, annual call 500~55000), 平均12年救護經驗
❷需要參照新光醫院急診之統計資料(包括EMT, EMT-P之資料)

10. Were all clinically important outcomes considered? ☑ Yes ☐ Can't tell ☐ No

HINT: Consider
- Is there other information you would like to have seen?
- If not, does this affect the decision?

Ans:
本篇研究目的很明確: 給予scoring table→改善GCS scoring正確率
故outcome就是比較給/不給予scoring table的分數差異

11. Are the benefits worth the harms and costs? ☑ Yes ☐ Can't tell ☐ No

HINT: Consider
- Even if this is not addressed by the review, what do you think?

Ans:
本研究結果顯示提供scoring table確實可以提高評估GCS score時的正確率，而scoring table亦不會花太多成本製作 ➲ 值得施行!


Thank you for your attention!