NUSGRA
Newcastle Ultrasound Guided Regional Anaesthesia

The Newcastle upon Tyne Hospitals NHS Foundation Trust

Implementation of a continuous scoring system for chest trauma patients in a UK Level 1 MTC

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Introduction

The Royal Victoria Infirmary, Newcastle upon Tyne, is a Level 1 Major Trauma Centre receiving approximately 200 chest trauma patients per annum. This is a high risk group with an overall complication rate of 13% (predominantly respiratory) and a mortality rate of 10% [*Flagel et al, Surgery, 2005*].

We have an established regional anaesthesia service and routinely provide paravertebral catheters to chest trauma patients, having inserted 130 for this indication alone, in the last 12 months.

We set out to implement a system which would allow us to:

- ✓ Monitor effectiveness of any acute pain intervention
- ✓ Risk assess and prioritise chest trauma patients for regional anaesthesia intervention
- ✓ Improve clinical outcomes

PIC Scoring

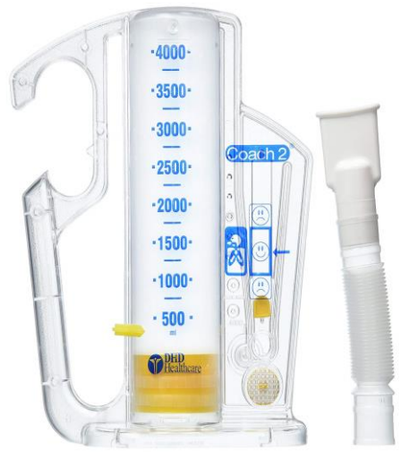
In March 2018 we implemented an adapted version of a scoring system originally developed by Wellspan York Hospital, Pennsylvania, USA (L1 trauma centre).

All chest trauma patients underwent PIC scoring four times daily. This involved recording of:

1. Chest pain score
2. Inspiratory capacity
3. Cough strength

	Deep Insp Pain Score	Inspiratory Capacity	Cough
1 point	Severe (8-10)	Unable to perform	Absent
2 points	Moderate (5-7)	Below alert	Weak
3 points	Mild (0-4)	Between alert and goal	Strong
4 points		Above goal	

Inspiratory capacity is measured using a bedside incentive spirometer, which all chest trauma patients are provided. Actual values are compared to predefined ALERT and GOAL values, ascertained from nomograms based on patient age and height / demi-span.



Patients scoring a 1 in any of the three categories are urgently highlighted to the parent medical team, to undertake a timely assessment. Expected management options will include further physiotherapy or optimisation of analgesia. At our facility, this is almost exclusively a paravertebral catheter.

Acknowledgements:
N Stephens and E Flynn (acute pain team)
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Evidence

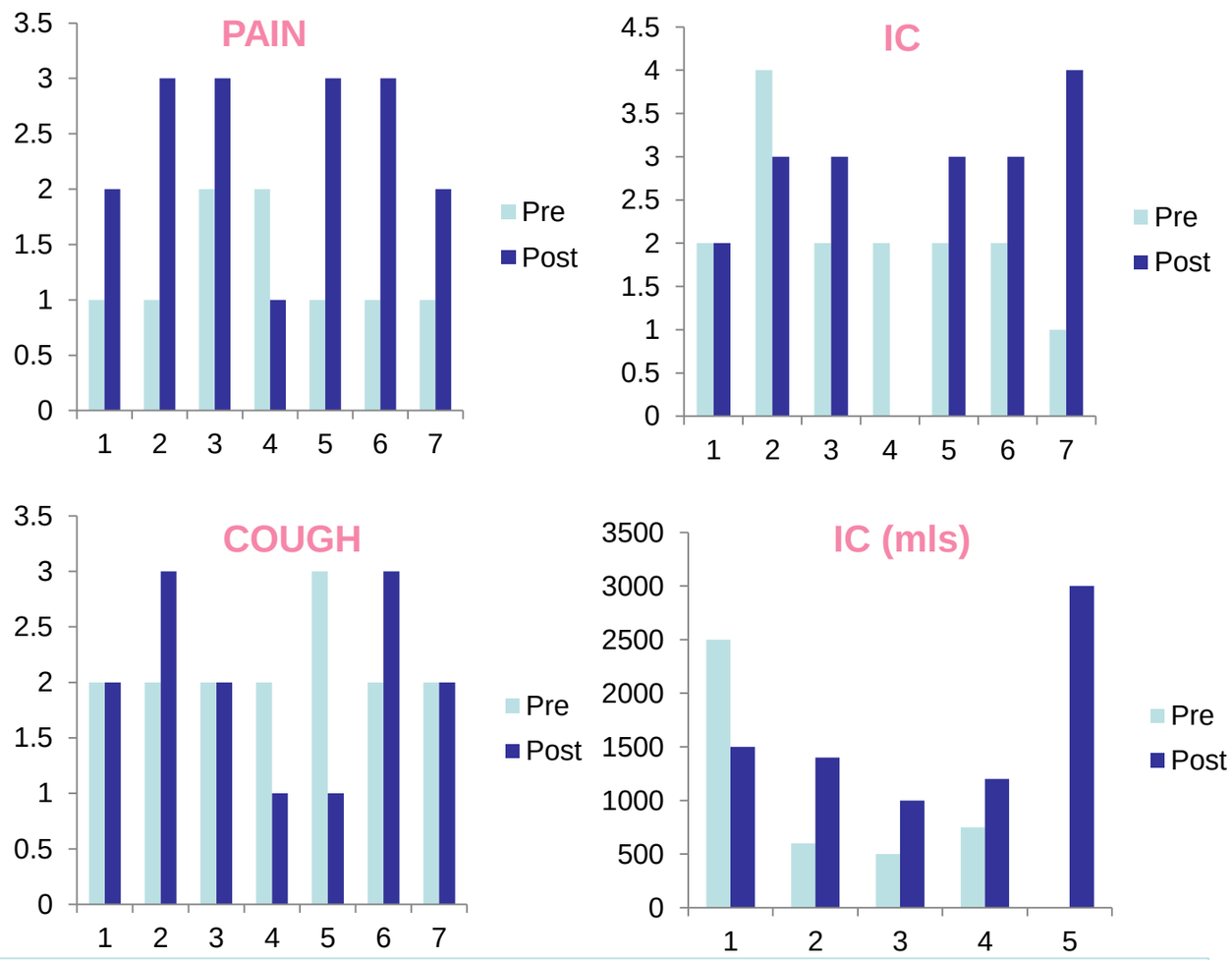
In a Texas L1 trauma centre, use of PIC scores to enrol high risk patients into a MDT pathway (physio, pain and nutrition) was associated with reductions in: [*Todd et al, Am J Surg, 2006*]

- ✓ ICU and Hospital LOS by 2.4d and 3.7d (p= 0.1 and 0.2)
- ✓ Pneumonia OR 0.12 (p=<0.001)
- ✓ Mortality OR 0.37 (p=0.06)

Wellspan, Pennsylvania used PIC to guide place of admission:

- ✓ 57% drop in unanticipated respiratory crit care admissions (p=0.02)
- ✓ Hospital LOS down 0.7d (p=0.06)
- ✓ Home discharge up 13% (p=0.07)

PIC and PV catheters - (interim data)



Implementation & Experience

Working closely with the trauma physiotherapy and acute pain teams at our facility, we undertook a trial period of PIC scoring for all chest trauma patients admitted to the trauma ward or trauma HDU. This overlapped with an intensive program of training for nursing staff and regional anaesthetists.

Advantages to physiotherapy teams:

- ✓ Objective measures of lung function to highlight most at risk patients
- ✓ Ability to reference measured lung function to expected normal values
- ✓ Easily communicable alert system

Advantages to pain and anaesthetic teams:

- ✓ Risk assessment of patients and prioritisation of regional anaesthesia provision
- ✓ Objective quantification of benefit after acute pain interventions
- ✓ Highlighting inadequate or failed blocks for early resiting

Future

Use of PIC criteria thresholds to:

- ➢ Identify high risk patients for RA interventions
- ➢ Guide level of care (ward vs HDU)
- ➢ Guide timing of discontinuation of regional anaesthesia