Pneumonia as a complication of Rib Fractures in Trauma

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Trauma Services

Pneumonia

- •\$ 40.2 billion cost in 2005
- •8th leading cause of death
- •55,477 deaths from pneumonia in 2006
- •Trauma patients susceptible from stress and weakened immune system, in addition to direct injury
- •Well known complication of rib fractures, especially in elderly

Problem

OSMC pneumonia rate (complication) associated with rib fractures was 5.2%

Significant outlier in MTQIP data 2011.

Above NTQIP benchmark of 4.9%

2011-2012 quality improvement project began in October, 2011.

Goal was a rate of 3.9%

Guidelines developed

Patient group identified

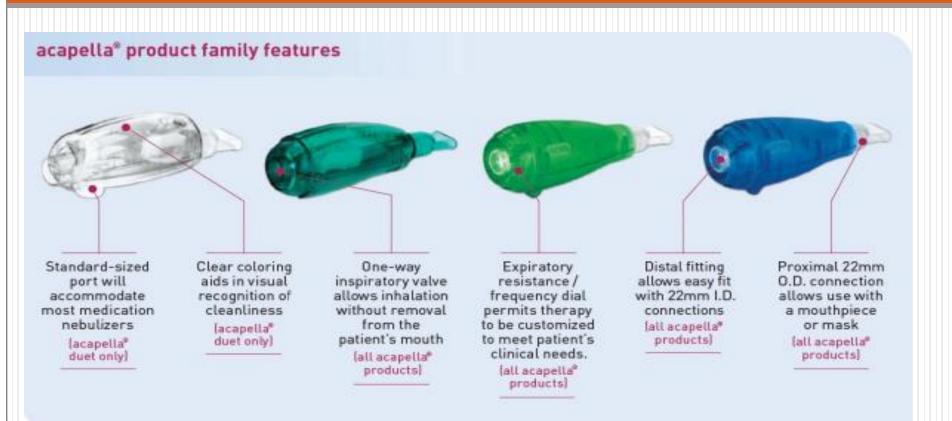
2 or more rib fractures

Patients requiring admission to the hospital

Hospital LOS > 1 day

Initial intervention, begun November,2011 Changed Incentive Spirometer to Acapella device.

Acapella device



October 2011- January 2012

- Initial reporting period
 - 22 patients
 - 50.77 average age
 - 5.5 day average LOS
 - 16 average ISS
 - 2.81 average Chest AIS
 - 4.40% pneumonia rate (down 0.8 %)

Guidelines revised

Acapella continued
On-Q pain pump with marcaine inserted
for continuous rib block. Para spinal
insertion position

Increased staff awareness (physician, nurse and RT)

On-Q pain pump



February 2012 to May 2012

- Follow up reporting period
 - 31 patients
 - 56.29 average age
 - 4.58 average LOS (down.92 days)
 - 20.5 average ISS (higher severity)
 - 2.52 average Chest AIS (lower severity)
 - 3.23% pneumonia rate (down 1.17%)

Further guideline revision

Acapella continued
On-Q pain pump continued

BiPap utilize at night 2100 – 0800 for pulmonary support and to maintain lung recruitment

BiPAP





June 2012 to September 2012

- Final reporting period
 - 15 patients
 - 51.91 average age
 - 3.6 day average LOS (down additional .98 day)
 - overall LOS decrease of 1.9 days
 - 12.07 average ISS (lower injury severity)
 - 2.73 average Chest AIS (Higher chest injury)
 - Pneumonia rate 0% (down 3.2%)

Rib Fracture Protocol

Inclusion

2 or more rib fractures

Hospital admission

>1 day LOS

Intervention

Acapella

On-Q Pain pump with marcaine, para spinal insertion

BiPap support at night 2100 – 0800 throughout admission

Results

- 1 year study period
- 68 patients
- LOS decreased from 5.5 to 3.6 day average
 - 1.9 day decrease
- Average age 53
- Average ISS 16.04
- Average Chest AIS 2.7
- 12 month pneumonia average 0.64%
 - 4.56% decrease with 0% in final 4 months

Conclusion

- Aggressive control of pain with On-Q pain catheters in para spinal position
- Respiratory support and recruitment with Acapella vibratory PEP therapy system (\$40 cost)
- Maintenance of recruited air space with BiPAP therapy overnight with full face mask (\$50 cost)
- Combined, these therapies are synergistic and drastically reduce the incidence of pneumonia.
- There is reduced morbidity, mortality and length of stay with minimal cost, more than covered by decreased LOS

Summary

- Rib Fracture Protocol is effective and beneficial
 - Decreased length of stay by 1.9 days
 - Decreased ICU stay by 1.34 days
 - Decreased Ventilator support by 1.18 days
 - Decreased pneumonia rate by 4.56%



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