BUG JUICE AND CHEST TUBES: ARE PROPHYLACTIC ANTIBIOTICS NEEDED FOR TUBE THORACOSTOMY PLACEMENT?

Morgan Brown MD, Katherine Pavleszek, Ryan Schroeder, Jonathan Schoen MD, Alan Marr MD, Patrick Greiffenstein MD, John Hunt MD, Lance Stuke MD, Alison Smith, MD, PhD 1. Department of Surgery, Louisiana State University Health Sciences Center, New Orleans, LA

BACKGROUND

- Chest tube placement following traumatic injury is a commonly performed procedure
- These procedures have associated infectious risks of empyema and pneumonia
- The use of prophylactic antibiotics for tube thoracostomy for traumatic thoracic injuries remains controversial

STUDY OBJECTIVE

To determine if prophylactic use of antibiotics for tube thoracostomy following trauma was associated with reduced rates of infection

METHODS

- Retrospective chart review of adult trauma patients admitted to Level I trauma center
- Study included patients who underwent single tube thoracostomy for traumatic injury
- The primary outcome was post-procedure empyema
- Secondary outcomes included pneumonia, *C. difficile colitis*, injury severity, hospital LOS, ICU LOS, in-hospital mortality

RESULTS

Table 1. Clinical outcomes and complications for patients undergoing single tube thoracostomy for traumatic thoracic injuries

*Statistically significant

Patient Demographics	No antibiotics n=527	Antibiotics n=298	p value
Penetrating mechanism, n (%)	248 (47.1)	132 (44.0)	0.42
Injury severity score, avg (SD)	17.0 (11.4)	20.7 (10.4)	0.0001*
COVID 19 positive, n (%)	7 (1.3)	2 (0.7)	0.50
Chest Tube Data			
Large bore (≥28 Fr), n (%)	394 (74.8)	227 (75.7)	0.80
Hospital Outcomes			
Empyema, n (%)	22 (4.2)	13 (4.3)	1.0
Pneumonia, n (%)	75 (14.2)	51 (17.0)	0.31
C. difficile colitis, n (%)	0	4 (1.3)	0.02*
Sepsis, n (%)	27 (5.1)	32 (10.7)	0.005*
ICU admission, n (%)	243 (46.1)	235 (78.3)	0.0001*
ICU LOS, avg days (SD)	6.7 (7.1)	8.3 (9.3)	0.006*
Hospital LOS, avg days (SD)	6.9 (7.9)	16.5 (35.0)	0.0001*
Intubation, n (%)	85 (16.1)	87 (29.0)	0.0001*
Mechanical ventilator, avg days (SD)	6.8 (8.0)	9 (9.1)	0.0003*
In-hospital mortality, n (%)	174 (33.2)	68 (22.7)	0.002*

- 825 patients who underwent single chest tube placement were evaluated
- 36% (298) received antibiotics prior to chest tube placement
- Antibiotic group had higher injury severity score (20.7 vs 17, p=0.0001)
- There was no significant difference in rate of empyema (4.3 vs 4.2%, p=1) or pneumonia (17% vs 14.2%, p=0.31)
- There was no difference in rates of penetrating mechanism (44 vs 47%, p=0.42)
- There was a higher rate of *C. difficile* colitis in the antibiotic group (1.3% vs 0%, p=0.02)
- There were higher rates of sepsis, ICU admission, intubation, and hospital/ICU length of stay in the antibiotic group
- In-hospital mortality was higher in the non-antibiotic group (33.2% vs 22.7%, p=0.002)

RESULTS

	Odds Ratio	95% CI	p-value
Age	1.009	0.995-1.023	0.217
Penetrating Mechanism	1.023	0.598-1.752	0.933
ISS	1.038	1.016-1.060	<0.001
Antibiotics	1.738	1.036-2.914	0.036

Table 2. Multivariate analysis for demographics and hospital outcomes

CONCLUSION

- This study demonstrated that prophylactic use of antibiotics prior to chest tube placement is not associated with decreased rates of infectious complications such as pneumonia or empyema
- Use of antibiotics can be associated with increased risk of other infections, including *C. difficile* colitis

REFERENCES

1. Sanabria A, Valdivieso E, Gomez G, Echeverry G. Prophylactic antibiotics in chest trauma: A meta-analysis of high-quality studies. *World J Surg*. 2006;30(10):1843-1847. doi:10.1007/s00268-005-0672-y
2. Cook A, Hu C, Ward J, et al. Presumptive antibiotics in tube thoracostomy for traumatic hemopneumothorax: A prospective, Multicenter American Association for the Surgery of Trauma Study. *Trauma Surg Acute Care Open*. 2019;4(1). doi:10.1136/tsaco-2019-000356
3. Dubose J, Inaba K, Okoye O, et al. Development of posttraumatic empyema in patients with retained hemothorax: Results of a prospective, observational AAST study. *J Trauma Acute Care Surg*. 2012;73(3):752-757. doi:10.1097/TA.0b013e31825c1616