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R2 Block 2

Reference: Kulvatunyou, Erickson, Vijayasekaran, Gries, Josph, Friese, O'Keeffe, Tang, Wynee, Rhee. Randomized clinical Trial of pigtail catheter versus chest tube in injured patients with uncomplicated traumatic pneumothorax 101:17-22 ~~XXXXXX XXXXX XXXXX XXXXX XXXXX XXXXX~~ Br J Surg. 2014 Jan;101(2):17-22. doi: 10.1002/bjs.9377.

Question: Can ER providers place pigtail catheters instead of traditional large bore chest tubes in patients with uncomplicated pneumothorax? Will this result in less pain or any clinical difference in outcomes?

Introduction: Pigtail catheters are being frequently used in pediatric and non-traumatic situations to drain effusions and pneumothorax. Very few studies have studied catheter placement in injured patients. This study has tried to quantify and explore the benefits of smaller pigtail catheters in terms of pain.

Methods: Patients eligible for the study were injured patient at University of Arizona between July 2010 and February 2012. Eligibility criteria included at least 18 years old, traumatic pneumothorax requiring chest tube insertion, patient was conscious and able to report pain. A criterion for insertion of a tube wasn't standardized. However in general, for penetrating trauma with pneumothorax > 10%, a tube was inserted. For blunt trauma a tube was inserted if less than 10% in which a progression of pneumothorax was noted on subsequent A/P CXR's. Final decision to enroll the patient into the study, as well as the timing of tube insertion was left to the managing physicians. Patients were randomized to one of two treatment groups using a sealed envelope. Patient was randomly assigned to receive either a 24 Fr chest tube or a 14 Fr pigtail catheter. Primary measured outcomes were pain at the tube site and daily pain meds. Secondary outcomes were success rate and tube insertion related complications as well as tube duration and length of hospital stay. Both pigtail and chest tubes were inserted by an attending trauma surgeon/surgical resident. One percent lidocaine was given and IV morphine. Amount of morphine received was not protocolled. Pigtail was inserted using Seldinger technique at 4-5th intercostal space. All lines were left to suction for 24 hrs. Further management was left to the trauma surgeon's discretion. In general, CXR after 24 hr showed resolution of pneumothorax. Tubes were then placed on water seal. X-ray was repeated at 4-6 hr. If there was no pneumothorax/recurrence tube was removed and a final CXR repeated at 4-6 hr after removal. Pain was measured subjectively on a scale from 1-10 starting at 1-2 hr after local anesthetic subsided. A baseline tube site pain score was then obtained using the NRS. Scores on both day 1 and 2 by the patients nurse blinded by the trial and the total amount of IV pain meds used per 24 hr was recorded. Pain score measurements stopped after 2 days because most tubes had been removed.

Results: A two-sided test was used in which  $P < .05$  was considered statistically significant. 75 patients were screened and 40 enrolled, 20 in the chest tube, and 20 in the pigtail group. There were no significant differences in baseline characteristics between the two groups. Baseline chest wall pain was similar in the two groups. Mean tube site pain was significantly lower following pigtail insertion at day 0 as well as day 1 and 2. 3.2 vs 7.7, 1.9 vs 6.2, 2.1 vs 5.5 on days 1/2/3 respectively. 24 hr pain medications usage for the first two days was also lower in the pigtail group as well. Success rates were similar. Each treatment group had 1 extra pleural placement and 1 dislodgement.

Discussion: This study further affirms the applicability of pigtail catheters in pneumothorax. According to this study it is far less painful to have 14 Fr pigtail catheters placed than 28 Fr chest tubes. Strengths include the randomized design and blinding of the nurse obtaining pain scores. Limitations include the pain scores. This is obviously subjective and are variable according to each person, their environment, and expectations. Furthermore upon original insertion of the catheters an unknown amount of morphine was used during the procedures, which could influence their day 0 scores or baseline pain if they received lots of morphine. The study also converts IV and PO narcotic equivalents, which vary in their effects from person to person. The study only had 20 people in each treatment group so it was of low power. However, the insertion techniques and the ways pain were recorded were standardized across both groups. The differences in pain score were not close and were statistically different suggesting that pigtail catheters require lower amounts of narcotics for pain control, while being as effective as chest tube for pneumothoraxes.

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