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ATRIUM Clinical Update

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Reducing Pain of Chest Tube Removal

Pain management continues to be a major concern of hospitalized patients. While many strides have been made treating pain, it would be best if we could reduce pain from the start. *The Journal of Clinical Nursing* published a well-written literature review on chest tube removal pain earlier this year[1] (that contains citations to the studies discussed here) and it gives us a chance to provide tips for evaluating this type of research and to review the current state of knowledge.

These May Skew Findings

In order to provide ethical nursing care, analgesics cannot be withheld from patients in pain in order to establish a control group for a research study. Early research about chest tube removal used control groups because the research then was designed to determine the sensations and level of discomfort patients felt during chest tube removal. Once it was clear that chest tube removal without premedication is indeed, uncomfortable, research study design shifted to comparing how well different types of analgesia mitigate the discomfort.

One of the greatest challenges for researchers are the variables that affect a patient's postoperative, procedure-related pain experience. Since chest tubes are typically removed within 24 hours of heart surgery, there will be some residual effect from anesthesia and standard postoperative analgesics. It is virtually impossible to control for baseline analgesia and how those drugs will interact with the study drugs administered. At best, baseline pain measurements are done before the intervention drugs are given, but in reality, it's not practical to develop a method that would account for individual patients' pharmacokinetics.

Another challenge for premedication situations is determining the optimal time to wait after medication is administered before the procedure is done and then putting research into practice. Unless there is a clinician available who does not have to be in the OR during the day, approaches that require timing such as applying EMLA cream and waiting three hours may be extremely difficult to implement in everyday bedside care.

Sensations Associated with Chest Tube Removal

Initial nursing research first focused on determining just what sensations patients experienced so that interventions could be based on evidence rather than an assumption that all discomfort was caused by pain. It turned out that in addition to pain, patients described the pulling and burning sensations they felt as equally uncomfortable.

Around the same time, three studies were done on nonpharmacological interventions to mitigate discomfort. Music, guided relaxation and topical ice therapy had no effect. However, these interventions might have a synergistic effect when combined with medication.

Opioids, Local Anesthetic, or Medical Gas?

Research now focuses on comparing classes of drugs: opioid analgesics, typically morphine; local anesthetics such as lidocaine and EMLA cream; and inhaled nitrous oxide.

Check Your Knowledge...

Q. What is a VAS (used for patient assessment)?

Answer on other side

Opioids

There is no question that morphine is an effective analgesic; the question is, how much is needed to relieve discomfort associated with chest tube removal? After an initial study in which 4mg was given IV 5-15 minutes before the procedure showed little effect on patient comfort, researchers administered 0.1mg/kg doses instead. The most recent study[2] called for that dose of morphine, administered a full 20 minutes before the procedure, and patients reported much better pain control during chest tube removal. As always, there is a risk of hypoventilation with opioids, and these researchers excluded patients with elevated $PaCO_2$ levels at baseline postoperatively from their research group.

Local Anesthetics

Local anesthetics have been studied under three general administration protocols. Bupivacaine, administered through the lumen of the chest tube; lidocaine or bupivacaine infiltrated subcutaneously or subfascially around the tube insertion site; and EMLA cream applied topically. Interpleural bupivacaine was equivalent to saline in one study of 41 adults. On the other hand, subcutaneous bupivacaine or subfascial lidocaine (with or without simultaneous IV morphine) has consistently shown favorable results.

Nitrous Oxide

Entonox, an equal gaseous mixture of nitrous oxide and oxygen, has also been examined. This gas mixture is popular for treating pain outside the U.S. during prehospital care. When Entonox inhalation is used alone, compared with morphine or local infiltration, there is a significant lack of pain control. It may have a place in combination with another approach.

EMLA

EMLA stands for "eutectic mixture of local anesthesia" in which equal parts of lidocaine and prilocaine are mixed. This eutectic mixture allows the two anesthetics to remain in a liquid-oil state at room temperature, significantly increasing dermal absorption. A layer of cream is applied to the site and covered with an occlusive dressing. Local anesthesia is achieved in about an hour, but peak effect takes 2 to 3 hours. While this approach eliminates the need for needlesticks to infiltrate the local tissue, the need to plan ahead and apply the cream three hours in advance may be unrealistic on some surgical services.

One study of 52 adults that administered EMLA and morphine to one group and EMLA alone in the other group found the EMLA provided better comfort without any sedation. A similar study in children found less response to the discomfort from the procedure when EMLA alone was used.

Summing it Up

We do have an evidence base that can guide our efforts to reduce the pain and other unpleasant sensations our patients feel when chest tubes are removed. The one point the successful approaches have in common — waiting ample time for the drugs to take effect — is the one that will challenge implementation at the bedside of patients on a busy surgical service.

See sources on page two.

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In The Literature

A,A and O – Really?

The current issue of the *Journal of Nursing Scholarship* contains an interesting review of the literature and discussion about nurses' use of "orientation" when assessing level of consciousness. As the author points out, people can be disoriented when their level of consciousness is diminished as well as when they have organic brain disease such as dementia or psychiatric illness. Alverzo begins by questioning "person, place and time" as key indicators of anything. Most people would not know the time if they were sick and in a room without windows. Patients who wake up in strange places such as an ED may have no idea where they are. While nurses have relied on this assessment, no research has validated it. This is a great look at one of those sacred cows.

Source: Alverzo JP: A review of the literature on orientation as an indicator of level of consciousness. *Journal of Nursing Scholarship* 2006;38(2):159-164.

ADN to BSN – Cold Cash

We are not going to fight the entry into practice issue here, just as Christina Graf didn't in her article in the current issue of *Nursing Economic$*. She examined the issue in dollars and sense — do AD nurses who go back to school for their BSN offset the cost of their education with workplace wage premiums? For more than half the nurses, the answer is no.

Currently, we need to increase the nursing workforce to manage increased patient demand and the impending retirement of baby boom nurses. Sixty percent of new grads in 2000 had two year degrees. In areas of acute shortage, does it make sense to increase opportunities through shorter programs to get more bodies at the bedside, and then provide support for furthering their education? That debate will never be resolved, but Graf provides a fascinating perspective on the challenges we face.

Source: Graf CM:ADN to BSN: Lessons from human capital theory. *Nursing Economic$* 2006;24(3):135-141.

Only Need to Know, Please!

How do you limit information about evidence-based practice changes to the bare bones "need to know"? One method is described in the current issue of *Nursing Management*. The authors describe a system they implemented, called TRIP — Translating Research Into Practice. They boil things down to a single page, colorful summary sheet that is a quick read for staff and not as intimidating for budding authors. By creating a template, nurses know what to expect and where to find certain information. The goal for TRIP is to disseminate information quickly, and to encourage nurses with practice questions to do their own review of the literature and report back to their colleagues.

Source: Block LM, LeGrazie BA: Research into practice: don't get lost in translation. *Nursing Management* 2006;37(5):37-40.

On the World Wide Web...

Symptom Research

The National Institutes of Health has published an online textbook called "Symptom Research: Methods and Opportunities." This 27-chapter book is interactive, and provides a wealth of information about designing research and assessing symptoms such as pain, delirium, fatigue, insomnia and sleep loss, and dyspnea. If you are looking for new assessment tools to use in the clinical setting, setting up a research protocol, or looking for more information to use when interpreting published studies, this site will save you a lot of trouble.

http://tinyurl.com/e75nd

Pain Scales in 17 – no, 18 Languages!

The British Pain Society has published their standard pain scale in 17 different languages – all available free for download.

http://www.britishpainsociety.org/pain_scales.html

Partners Against Pain offers a simple scale in 18 languages with few that overlap the BPS languages at http://tinyurl.com/qqmup as well as a comprehensive pain assessment toolkit at http://tinyurl.com/md8j3

If you have ever felt frustrated by a lack of a translator for a patient who appears to be in pain, these sites are for you.

Taking Care of Pain

The City of Hope's Beckman Research Institute has published a comprehensive list of resources for nurse researchers and for bedside practice. In addition to pain assessment, there are chart audit tools, quality of life assessments and lots of information on end-of-life care, one of AACN's priorities.

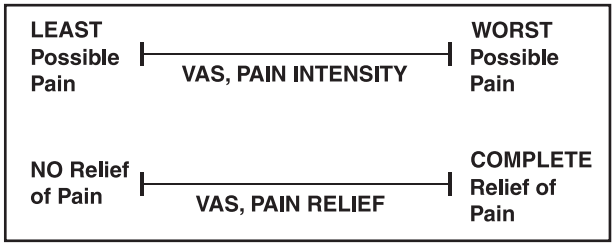
http://cityofhope.org/prc/pain_assessment.asp for pain assessment

http://cityofhope.org/prc/res_inst.asp for research instruments

Sources from page one:
1. Bruce EA, Howard RF, Franck LS: Chest drain removal pain and its management: a literature review. *Journal of Clinical Nursing* 2006;15:145-154.
2. Akrofi M, et al: A randomized comparison of three methods of analgesia for chest drain removal in postcardiac surgical patients. *Anaesthesia Analgesia* 2005;100:205-209.

Check Your Knowledge...

A. VAS stands for "visual analog scale" which means that patients rate their pain by identifying a point on a line, rather than verbally assigning a number to their pain. Research has found good reliability with this instrument in acute pain.



(Graphic courtesy National Institutes of Health)
http://symptomresearch.nih.gov/chapter_1/optmaterial.htm

Bijur PE et al: Reliability of Visual Analog Scale for Measurement of Acute Pain. *Academic Emergency Medicine* 2001;8(12):1153-1157.