

Trauma MedEd

How To Read A Stab Wound

Most emergency departments do not see much penetrating trauma. But it is helpful to be able to learn as much as possible from the appearance of these piercing injuries when you do see them. This post will describe the basics of reading stab wounds.

Important: This information will allow some basic interpretation of wounds. It will not qualify you as a forensics expert by any means. I do not recommend that you document any of this information in the medical record unless you have specific forensic training. You should only write things like "a wound was noted in the midepigastrium that is 2 cm in length." Your note can and will be used in a court of law, and if you are wrong there can be significant consequences for the plaintiff or the defendant. This information is for your edification only.

1. What is the length of the wound? This does not necessarily correspond to the width of the blade. Skin stretches as it is cut, so the wound will usually retract to a length that is shorter than the full width of the blade.

2. Is the item sharp on one side or both? This can usually be determined by the appearance of the wound. A linear wound with two sharp ends is generally a two sided knife. A wound with one flat end and one sharp end is usually from a one-sided weapon. The picture below right shows a knife wound with one sharp side.

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TRAUMA CALENDAR OF EVENTS

EMCRIT TRAUMA CONFERENCE – CRITICAL TRAUMA IN THE ED

PLACE: MOUNT SINAI MEDICAL CENTER, NEW YORK, NY

DATE: JANUARY 9, 2013

EAST ANNUAL SCIENTIFIC ASSEMBLY

PLACE: JW MARRIOTT CAMELBACK INN, SCOTTSDALE, AZ

DATE: JANUARY 15-19, 2013

TRAUMA HISTORY

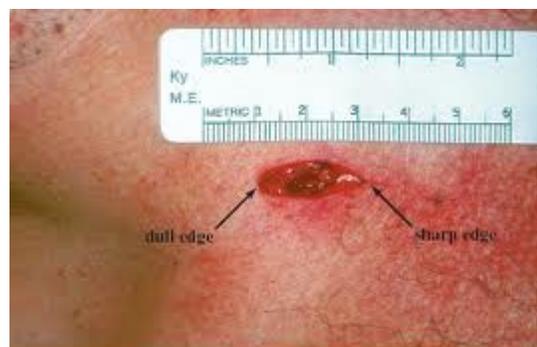
The Scudder Oration

One of the trauma highlights at the annual Clinical Congress of the American College of Surgeons is the Scudder Oration. Each year, a renowned trauma surgeon is invited to deliver this lecture on some facet of trauma care.

The oration is named after Charles L. Scudder, who established the first fracture service at the Massachusetts General Hospital in 1917. He and a group of surgeons (there was no such thing as an orthopaedic surgeon at that time) began meeting regularly, and adopted a syllabus entitled *Outline of Treatment of Fractures*. This work was adopted as the fracture manual by the American College of Surgeons. The group soon became the Committee on Fractures of the College.

About 10 years later, the ACS created the Annual Oration on Fractures at the Clinical Congress. This later became the Scudder Oration. And the Committee on Fractures? This combined with another committee to form what ultimately became the Committee on Trauma.

Outline of Treatment of Fractures, Arch Surg 6:172-194, 1923. Everything we knew about fractures is contained in 23 pages! See page 4 if you'd like to download a copy.



3. Is there a hilt? This can usually be detected by looking for bruising around the wound. The picture below shows a knife wound with a hilt mark.



4. What is the angle? If both edges are symmetric, the knife went straight in. If one surface has a tangential appearance, then the knife was angled toward that side. You can approximate the direction of entry by looking at the tangential surface of the wound edge.



5. How deep did it go? You have no way of knowing unless you have the blood stained blade in your possession. And yes, it is possible for the wound to go deeper than the length of the knife, since the abdominal wall or other soft tissues can be pushed inwards during the stab.

How To Perform A Retrograde Urethrogram

One of the hallmarks of urethral injury is blood and the meatus in males. The standard answer to the question "how do you evaluate for it?" is "retrograde urethrogram." Unfortunately, too few people know how to perform this test, and not all radiologists are familiar. Many times it falls to the urologist, who may not be immediately available.

The technique is simple. The following items are needed:

- A urine specimen cup
- A tube of KY jelly (not the little unit dose packs)
- A bottle of renografin or ultravist contrast
- A 50-60 cc Toomey syringe (slip-tip)
- A fluoroscopy suite

Pour 25cc of contrast and 25cc of KY jelly in the specimen cup, cap it and shake well. I prefer this mixture because it creates a contrast jelly which is less likely to dribble out when injected. Draw the contrast jelly up into the syringe. Under fluoro, insert the tip of the syringe into the penis and pull it toward yourself, pinching the meatus around the tip of the syringe. Slowly inject all the contrast, watching the contrast column on the fluoro screen. Once there is easy flow into the bladder, you can stop the study. If you see extravasation into the soft tissues, stop the study and call Urology.

The advantages to using this technique are:

- The contrast/jelly mix creates a contrast gel that is less likely to leak from the meatus when injected
- The jelly makes it easy to insert the catheter if no urethral injury is detected

Important tip: If you use the contrast jelly technique, be prepared to flush the urinary catheter with saline once it is inserted. The jelly almost always plugs it up, resulting in no return of urine when inserted.

Normal urethrogram (ignore my fingers and wedding ring):



Abnormal urethrogram:

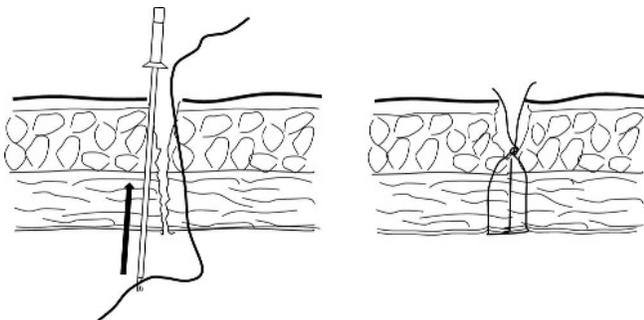


How To Close A Full Thickness Stab Of The Abdomen Laparoscopically

The algorithm for evaluating a stab to the anterior abdomen includes a number of different techniques for evaluation. In some cases where the chance of entry into the abdomen is thought to be low probability, endoscopic exploration can be used. What if a full thickness stab is detected, but the surgeon is able confirm that no abdominal injuries are present? Should the stab defect be closed?

There is no good data that tells us the incidence of ventral hernia from stab wounds. We do know that 10mm endoscopic port sites and larger can be the source of a ventral hernia and possible bowel obstruction after laparoscopic surgery, so it stands to reason (but be careful) that the same thing could happen with larger stabs. So why not close them?

A number of commercial devices have been developed for port site closure during endoscopic surgery (Carter Thomason Closure System, Cooper Surgical; Endo



Close, Covidien). A group in Tokyo published a description of the technique using the former device to close the fascial defect of a self-inflicted stab wound.

Bottom line: This is an interesting use for a device used for closing more controlled stab wounds (surgical port sites) in less controlled ones. It seems fair to extrapolate our current experience from laparoscopic surgery to trauma in this case. I would be very interested to hear from anyone who is currently using this technique.

Reference: A quick and easy closure technique for abdominal stab wound after diagnostic laparoscopy. J Trauma 72(5):1448-1449, 2012.

How To Insert An NG Tube (Not An NC Tube)!

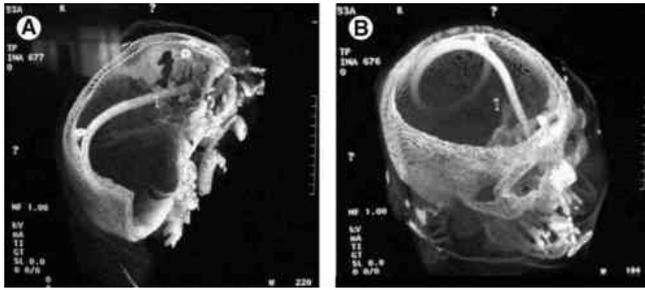
On occasion (but not routinely) trauma patients need to have their stomach decompressed. The reflex maneuver is to insert a nasogastric (NG) tube. However, this may be a dangerous procedure in some patients.

Some patients may be at risk for a **cribriform plate fracture**, and blindly passing a tube into their nose may result in a nasocerebral (NC) tube (see picture on next page). This is a neurosurgical catastrophe, and the outcome is uniformly dismal. It generally requires craniectomy to remove the tube.

The following patients are at risk:

- Evidence of midface trauma (eyebrows to zygoma)
- Evidence of basilar skull fracture (raccoon eyes, Battle's sign, fluids leaking from ears or nose)
- Coma (GCS<8)

If you really need the tube, what can you do? If the patient is comatose, it's easy: just insert an orogastric (OG) tube. However, that is not an option in awake patients; they will continuously gag on the tube. In that case, **lubricate a curved nasal trumpet** and **gently insert it into the nose**. The curve will safely move it past the cribriform plate area. **Then lubricate a smaller gastric tube and pass it through the trumpet.**



CT reconstruction of a nasogastric tube insertion gone terribly wrong

How To Observe An Occult Pneumothorax

Occult pneumothorax is the most common incidental finding on CT imaging, occurring in 2% to 10% of trauma patients. By definition, **an occult pneumothorax is a pneumothorax that is seen only on CT and not a conventional chest x-ray.** When detected, the question that comes to mind is, **will this patient need a chest tube?**

The AAST conducted a trial encompassing the experience at 16 Level I and II trauma centers around the US. They looked at injury severity, specific chest injuries, ventilator settings if on positive pressure ventilation (PPV) and size of pneumothorax. The size was calculated by measuring the largest air collection along a line perpendicular to the chest wall (see image above). Failure of observation meant that a thoracostomy tube was placed.

The 2 year study looked at a total of 448 occult pneumothoraces that were initially observed. Key findings of the study were:

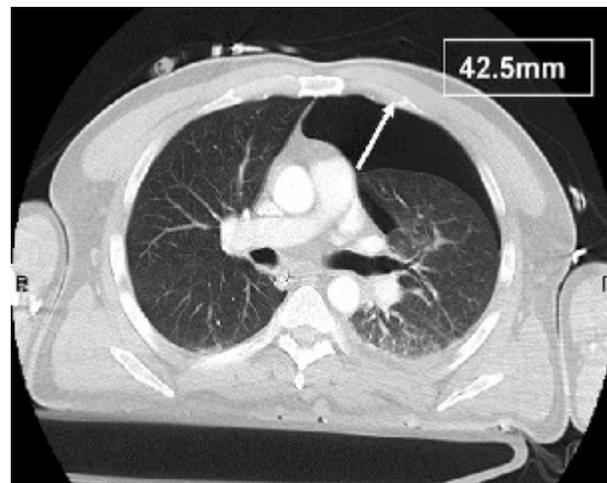
- Injury severity was no different between failure and non-failure groups
- There was a 6% failure rate overall
- PPV alone was associated with an increased failure rate of 14%
- Surgical intervention requiring PPV was not associated with an increased failure rate

- Pneumothorax size > 7mm, positive pressure ventilation, progression of the pneumothorax, respiratory distress and presence of hemothorax were associated with failure.

Pneumothorax size was not entirely reliable for predicting failure, since patients with sizes as small as 5mm on PPV and 3mm not on PPV failed in this series

Bottom line: Most blunt trauma patients with an occult pneumothorax can be safely observed. A followup chest x-ray should be obtained to look for progression. If the patient progresses, is placed on PPV, has a hemothorax or develops respiratory distress, have a low threshold for inserting a drainage tube. Maximum pneumothorax size may predict failure when large, but it can still happen with very small air collections.

Reference: Blunt traumatic occult pneumothorax: is observation safe? - results of a prospective, AAST multicenter study. J Trauma 70(5):1019-1025, 2011.



To download a copy of the *Outline of Treatment of Fractures*, scan this QR code or enter this URL in your browser:
<http://bit.ly/RAkMnl>



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