OBJECTIVES FOR 2015

Objective 1
- By the end of this presentation the participant will be able to discuss basic principles of Wound Management

Objective 2
- By the end of this presentation the participant will be able to review common pitfalls and strategies to avoid them in acute wound management

OBJECTIVES FOR 2015

Objective 3
- By the end of this presentation the participant will be able to list 4 common suture techniques used for primary wound closure.

Objective 4
- By the end of this presentation the participant will be able to discuss advantages and disadvantages of each technique reviewed in objective 3.
OBJECTIVES

Objective 5
• By the end of this presentation the participant will be able to demonstrate basic wound closure and knot tying using 3 of the 4 techniques discussed in Objective 3.

INTRODUCTION

On Line Resources
• Ethicon Wound Closure Manual
• Ethicon Knot Tying Manual
• You Tube

Books
• Wounds and Lacerations, Emergency Care and Closure; Alexander T. Trott
• Video
  • Advanced Suturing Techniques: Beyond the Basics

Video
• Advanced Suturing Techniques: Beyond the Basics
• Linda Blasen ACNP-BC (Fitzgerald Health Education Associates)

BASICS

Types of wounds
Obtain a thorough history
• Usual principals apply
  • HPI – OLDCART
  • date and time of injury (does this match what you see?)
  • nature of injury (blunt force, sharp, dull trauma)
  • how did it occur?
  • findings consistent with C/O?
• what were the circumstances that lead up to the injury?
  • Be suspicious of any wound sustained in the bathroom

Other injuries?
What other structures involved?
Immunization status?
• Td status in 10 years, 7 years for high risk occupations.
Comorbid conditions
• Other risk based on nature of wound
  • MOI, Age of wound, location
Initial wound care
• Clean wounds heal better
Anesthesia
• Comfortable patient is a happy patient
IRRIGATION AND WOUND CLEANING

MEDICATIONS

More on anaesthetics
- Wiz or Wizzout?
  - Epi that is...
- Types
  - Amide
    - lidocaine (Xylocaine™)
    - bupivacaine (Marcaine™)
  - Ester
    - procaine (Novocain™)
- Amino ester anesthetics are derivatives of PABA
- Allergy to these can be very common

MEDICATIONS

- Allergy to procaine (Ester) usually does not indicate allergy to lidocaine (Amide)
- Allergy to amide anesthetics very rare
- Manifestations usually urticaria, rash
- Report of lidocaine allergy is likely due to methylparaben preservative
- Preservative free preparation may be option
- Options to traditional infiltration anesthetics
  - Saline
  - diphenhydramine

MEDICATIONS

General guidelines on maximum dose
Toxicity dose related
- Lidocaine
  - 1% = 10mg per ml = 100mg of Lidocaine
  - Without epi max 4.5mg/kg (not to exceed 300mg)
  - With epi max 7mg/kg
- Bupivicaine
  - 0.5% = 5mg per ml
  - Without epi max 2.5mg/kg (not to exceed 175mg)
  - With epi max 3mg/kg (not to exceed 225mg)
WHAT’S THE SKINNY ON BUFFERING?

By adding Sodium Bicarbonate solution (1 mEq/ml) has shown some efficacy to reduce the patients pain perception.

We have to think what the buffering is doing to the anesthetic.

pH of Lidocaine is around 6.5. (this is why it burns)
By adding Bicarbonate, you bring it more neutral to a pH of 7.36.

You can not buffer anesthetic with epi.

MEDICATIONS

• Topicals
• LET
  • Combination of Lidocaine (4%) Epinephrine (0.1%) and Tetracaine (0.5%)
  • EMLA
  • Lidocaine (2.5%) and Prilocaine (2.5%)

ANESTHETIC CONSIDERATIONS

Plane of injection of local anesthetic
Use smallest needle practical
Usually 25, 27 or 30g, loaded on a syringe of sufficient volume to provide for anesthesia to wound

MORE BASICS

Patient comfort and safety
• Are they intoxicated?
Initial hemostasis
  • Never apply clamps blindly
Remove jewelry
• Rings, piercings
Provide for pain relief
• A comfy patient is a happy patient (that doesn’t move.)
**Closure options**
- Tape
- Glue
- "String"
  - Braided
  - Monofilament
  - Absorbable
  - Non-Absorbable
- Needle type
  - Taper (not for skin)
  - Cutting (best)

**Size of string**
- In general the greater the tension of the wound the greater the size of suture
- 0 to 7–0
- The more "0" the smaller the diameter
- 2–0 to 6–0 most common sizes for skin closure
- 0 and up (Big stuff)

**ANATOMY OF THE SUTURE**

**BASICS**

**Staples**
- Advantages
  - Fast, lower risk of infection, lower tissue reaction, might be able to apply without anesthetic
- Disadvantages
  - Really need 2 extra sets of hands to approximate wound edges
BASICS

- Are you prepared for what you need?
- Do you have everything set out?
- NO PICTURES PLEASE
- Make sure you’re comfortable in the position you have set up.

INSTRUMENT HANDLING

This makes or breaks your ability to perform an exceptional closure!

Think of the “holes” in the instruments as purely decorative
- No fingers in the “holes” unless it is too arm the needle holder or tie a knot...

INSTRUMENT HANDLING

Basic instruments and handling
- Small Webster needle holder
- Correct technique

INSTRUMENT HANDLING

Bad technique
Try it if you do not believe me
Very hard to manipulate armed needle holder like this
INSTRUMENT HANDLING

Arming the needle holder
Lock the holder about 1/3 of the distance from the swage
Grasp the needle in the tip of the holder
INSTRUMENT HANDLING

Scissors
- Tip control
- Iris vs. tentotomy
- Mini Metazenbaum

TIPS AND TRICKS

Wound closure can be done well in virtually any situation by following a few principals utilizing the most basic technique
- Adequate wound prep
- Careful assessment
- Was that a FB?
- Adherence to basics
- Careful approximation
- Good edge matching and eversion

TIPS AND TRICKS

Maximal reduction of resting wound tension
- Spacing
  - How close to wound edge?
    - Closer = reduced wound tension
    - Farther = increased wound tension
  - How far apart?
    - Distance to the next stitch should equal the distance to the wound edge

SPACING OF SUTURES
TIPS AND TRICKS

Elimination of all potential dead space
Selection of appropriate suture size
  • Dirty secret about size
Removal of suture at appropriate time
  • Range usually between 5 to 10 days
  • Face 4 to 5 days, no more than 5
  • Scalp 7 to 10 days
  • Body / Extremity
    • Low resting and or dynamic tension 10 days
    • High resting or dynamic tension 10–12 days

TIPS AND TRICKS

Reduce resting tension ***
Do not accept “OK” throws
Be realistic and advise patient accordingly
  • ALL WOUNDS SCAR!
Arrange for appropriate follow-up
  • Wound check
  • Come back for what?

BIGGEST SECRET OF ALL!

From a purely technical standpoint
  • By mastering 4 techniques demonstrated here there is virtually no wound you cannot handle
  • Simple interrupted
  • Horizontal mattress
  • Vertical mattress
  • Running
Other fancy techniques do not add a lot to your ability to cope with complex wounds

DOCUMENTING YOUR WORK

A Procedure note
Subjective Data
  • Usual note format for HPI, PMH, Immunization status etc.
  • Oh yeah, ALLERGIES?
  • Include a detailed account of the wound
    • Who, What, When, Where², How, Other injuries
    • Where did the wound happen
    • Where is the wound(s)
    • This is when a picture may be helpful before and after for follow up.
    • Build yourself a procedure template for your EHR system
**DOCUMENTING YOUR WORK**

**Objective data**
- Vitals
  - Account for any abnormals
- General appraisal of the patient
- Detailed description of the wound
  - Anatomical descriptors please
  - Size & Shape
  - Possible associated structures
  - Depth

**DOCUMENTING YOUR WORK**

**Functional assessment of the injured part**
- This is really important, **BEFORE** you administer the anaesthetic
  - Sensation, circulation, motion, motor

**The procedure itself**
- Any activities to prepare the patient
- Wound preparation
- Anaesthetic
  - Type, amount, administered how?

**DOCUMENTING YOUR WORK**

**Procedural cont...**
- Detailed description of wound assessment done under ideal circumstances
- You saw, or tried your best to see the bottom of the wound
- Presence or absence of FB, and that you really looked hard...
- Any additional work done to make the wound ready for closure
  - Debridement & other clean up

**DOCUMENTING YOUR WORK**

**The closure**
- What did you use, size & type

**How did you do it**
- Name and number
- Any thing left in the wound?

**Additional wound care after the closure**
- Condition of the patient after procedure
- Did you want to re-check the pulse or BP?
DOCUMENTING YOUR WORK

Dressing applied
Your Assessment
Wound care instructions for home
  • Details...
  • Written
Medicines given, what to expect, Pain?
Any referral?
When to return for recheck and watch for signs of infection
Why to come back at any other time

KNOT TYING BASICS

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KNOT TYING BASICS
Square knots only
The first throw is double to keep tension on the wound edges
“Granny knots” are considered bad form, and you will be judged harshly by your colleagues
Wounds are not supported when your stitches remove themselves early...
No matter what technique is used for closure the following commandments will be honored:

- Thou shall match layers perfectly
- Thou shall evert edges maximally
- Thou shall match skin landmarks perfectly
- Thou shall maximally reduce wound
CONSIDERATIONS DURING CLOSURE

For maximal edge eversion
The needle must enter and roughly exit the skin at 90 degrees
The cross section of the finished stitch should be box or flask shaped

CONSIDERATIONS DURING CLOSURE

Wound orientation
Edge matching
Wound edge eversion and approximation
KINDS OF CLOSURE

Interrupted
- Simple
- Mattress
- Horizontal
- Vertical

Continuous
- Running
CORNER OR WEDGE LACERATION

WEDGE LACERATION

WEDGE LACERATION

WEDGE LACERATION
SKIN ANATOMY AND PHYSIOLOGY

Body Skin tension lines

SKIN ANATOMY AND PHYSIOLOGY

Skin tension lines of face
Character lines follow the tension lines of the face
REFERENCES:

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The Ethicon Wound Closure Manual, and the knot manual can both be downloaded as pdf files from:

- www.ethicon.com
- www.google.com
- www.youtube.com

REFERENCES