IV Extravasation Injuries 101

ICANN's 26th Annual Conference

Pediatric Wound Care & Laser Specialists

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Objectives

- Definitions
- Description
- Prognostic Factors
- Documentation
- Importance of Early Recognition and Documentation
- Management
  - Initial Steps
  - Debridement
  - Granulation

Definitions

- **Infiltration** is the inadvertent leakage o
  vesicant solution from its intended vas
  pathway (vein) into the surrounding tis
- **Extravasation** is the inadvertent leakag
  vesicant solution from its intended vas
  pathway (vein) into the surrounding tis
  resulting in tissue necrosis and inflamm
- A **vesicant** refers to any medicine or flu
  potential to cause blisters, severe tissu
  (skin/tendons/muscle) or necrosis if it
  from the intended venous pathway

Common Vesicants

- Antibiotics: Vancomycin, Gentamicin, Penicillin, Cephalosporins
- Cardiac Meds: Dopamine, Dobutamine, Epinephrine
- Electrolyte solutions: Sodiu bicarb, Calcium gluconate
- TPN
- Other: radiographic contra material

Signs and Symptoms – Extravasation

- Color – Erythema, Pallor, Hyperpigmen
- Edema
- Blistering
- Blanching
- Delayed capillary refill
- Skin cool to touch
- Pain with palpation
- Decreased peripheral pulses.
- leakage of fluid at the insertion site
- inability to obtain blood return (not al
- change in quality and flow of the infus injection

Common initial findings of an IV extravasation

- How bad does this look to you?

Wha
dete
outc

extr
ir

3 Prognostic Factors for IV Extravasation Injuries


PATIENT NAME
10/30/16
DATE
WOUND SIZE
2.5x2x0.4
LENGTH
WIDTH
DEPTH
Discard After Single Use

Location

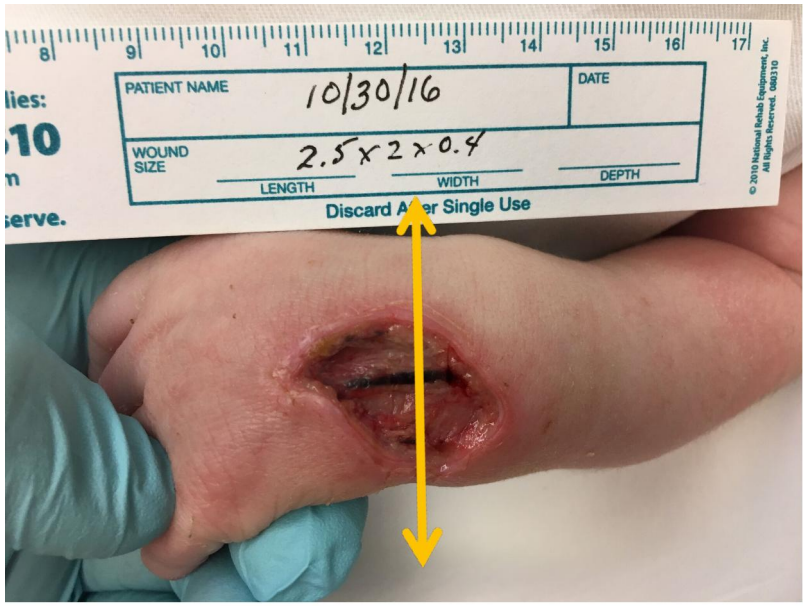
Extravasation injuries which cross over a joint increases the complications

A

B

C

Which of the above has the worst prognosis based on lo



A

B

C

Which of the above has the worst prognosis base
location?

3 Prognostic Factors for IV Extravasation Injuries

The color of
stages of th
represents th
the tissue
genera
extravasatio
will present
black or re

Which colo
worst pro

A

B

C

Which color suggests deepest tissue inj

A

B

C

Which color suggests deepest tissue inj

Anticipated Degree of Injury
Red Wound Bed – Limited to the skin al

Anticipated Degree of Injury

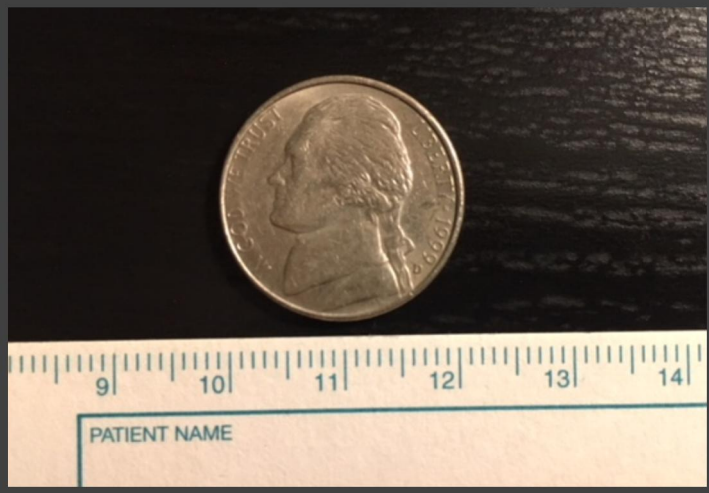
Black Wound Bed – Extends beyond skin to muscle a subcutaneous tissue

Anticipated Degree of Injury

White Wound Bed – Extends beyond muscle to b and tendon

3 Prognostic Factors for IV Extravasation Injuries

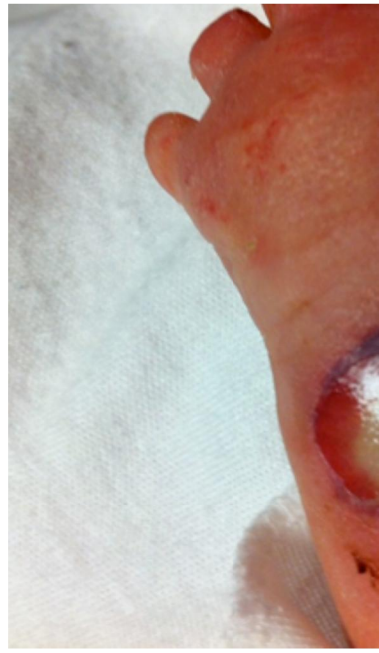
Size



>2cm will likely require aggressive inter
Slower healing and increased risk for com

1

2



3

Based on the above discussion, which wound has h
risk for complications?

Small size, Black color (musculature), not on flexu
Good Prognosis with proper care

Large size, Red/black, over the ankle joi
Worst prognosis. Will require close monito
Risk for joint infection, contracture.

Large size, White (extend beyond musculature), not on
Good prognosis with proper care.
Scaring is the most serious complicatio

Scalp Injuries – Unique Challeng

Location has grea
for complications

If high on the sca
extension into an
fontanelle.

If too low on the
scalp/forehead, h
permanent aesth
outcome.

Nursing Documentation of the Injury

- Time/Date the injury was identified
- What was infusing at the time of the injury?
- Location of the catheter
- Gauge and length of catheter
- Wound description of initial findings
- Management
- Notification of doctor/NNP, including time, information discussed and advice received
- Photographs per unit policy
- Notification of parents

Avoiding the Complicatio Hourly Assessment

- Assess past the point of insertion to point where the catheter ends in the
- Ensure that dressing allows for visualization of the IV catheter
- Minimize the dressings and choose dressings that allow for visualization
- When in doubt>call for help> d/c ca

Documentation requirements for an hour assessment

Management

Management

Stages of IV Extravasation Management

"When Will She Be

- Debridement*: 7
- Granulation:
  - Wound Vac: 7
  - Epithelializati
    : 7-14 days
- Most wounds are
  within 1 month

* Dependent of size

Normal Phases of IV Injur

Management of an extravasation- First steps

- Early intervention and identification of signs and symptoms of infiltration and extravasation is crucial, in order to prev serious adverse outcomes
- **This is a medical emergency any time day or night.**
- Goal is to reduce additional trauma an from occurring.
- Documentation will be an important as legal purposes.
- Contact attending physician and wound consultation.

Management – First St

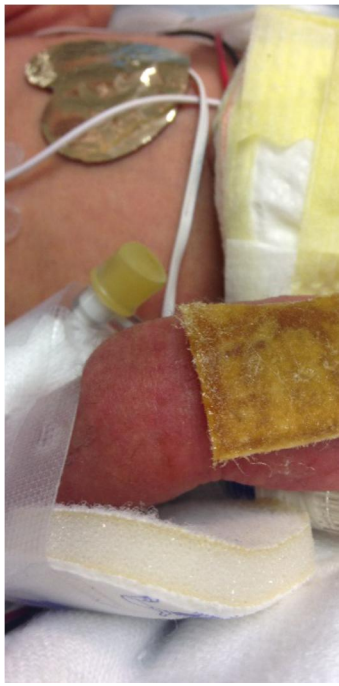
- Immediately stop the infusion/injectio
- Disconnect IV tubing or syringe contain
  but retain it to document amount of dr
- Leave the cannula/port needle in place
  temporarily
- Aspirate as much of the residual drug a
- Under no circumstances should the de
  flushed.
- Gently clean the IV site of all fluids and
  once the catheter is removed

Management – First St

- Hyaluronidase “Wydase”
  - Personal experience over the years has no benefit in the neonatal patient.
  - Outcomes are equivocal and in some case by this injection.
  - I do note recommend its use in the neona
- The affected limb should be elevated.
- Application of a cool or warm compres site has previously been recommended dependent upon the type of infusion/v and amount extravasated within the w

Management of extravasation – First Steps

- Application of Medical Grade Honey dressings in my personal experience has multiple benefits and excellent outcomes. This should be performed as soon as the injury is identified.
- Ideally both MGH gel and calcium alginate dressing should be applied.
- MGH secured with foam dressing.

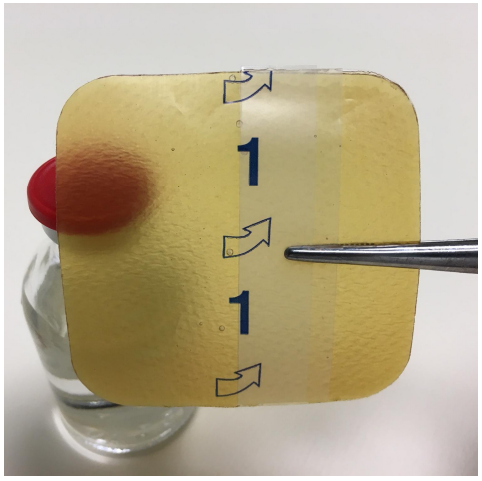


Debridement

- The role of debridement is to remove nonviable tissue to allow for new healthy tissue to grow within the space.
- The act of debriding a wound bed is reserved for the physician, nurse practitioner or certified wound specialist
- For purposes of IV extravasation injuries, the forms of debridement are limited to autolytic, mechanical and sharp debridement.

Calcium Alginate

Gel

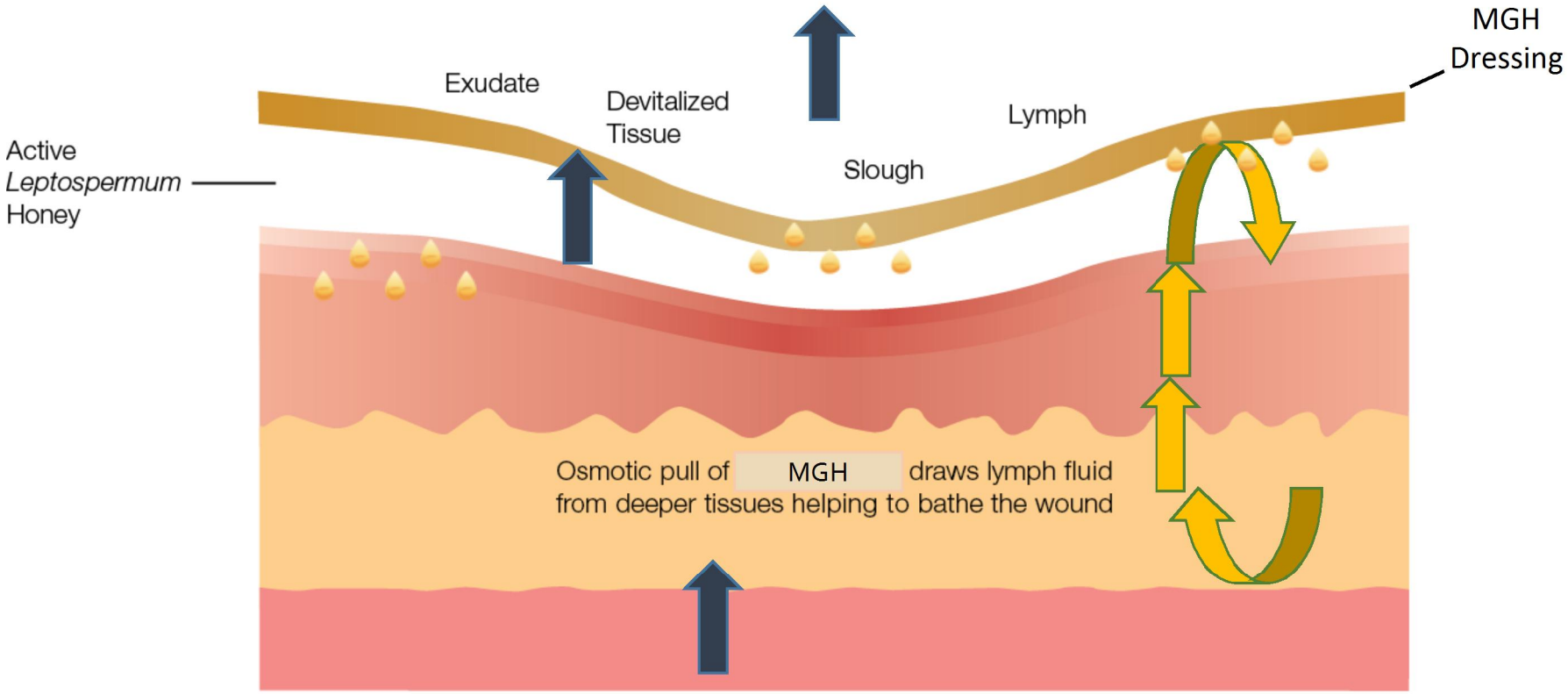


Debridement - Medical Grade Ho

Debridement - Medical Grade Honey

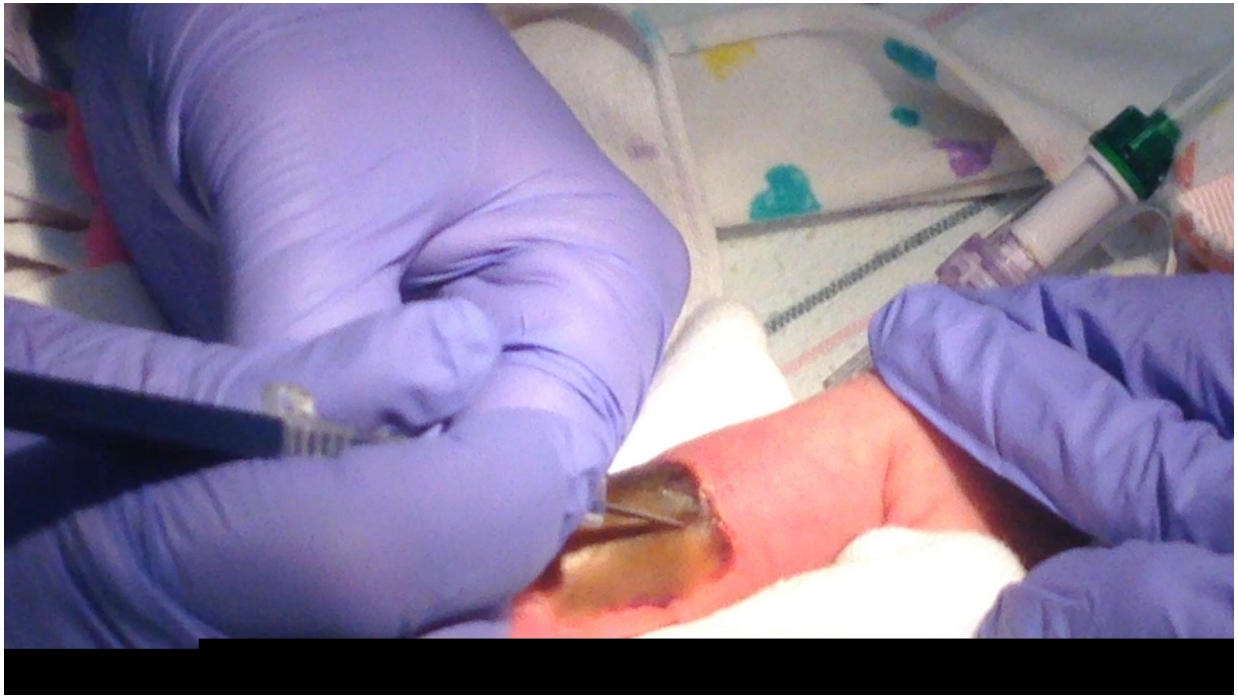
- Due to its their sugar content, MGH d
  act as hypertonic dressings
- Facilitates movement of fluid from an
  higher concentration to an area of lov
  concentration (osmotic activity) thus
  promoting debridement
- Osmotic effect promotes an outflow o
  fluid
- Provides an optimally moist environm
- The low pH of MGH helps to lower th
  within the wound environment which
  shown to have wound healing benefit
- Control of infection and inflammation

Osmotic Effect of Medical Grade Honey Facilitating Autolytic Debridement



Debridement – Mechanical/Monofilament pa

Debridement - Crosshatching

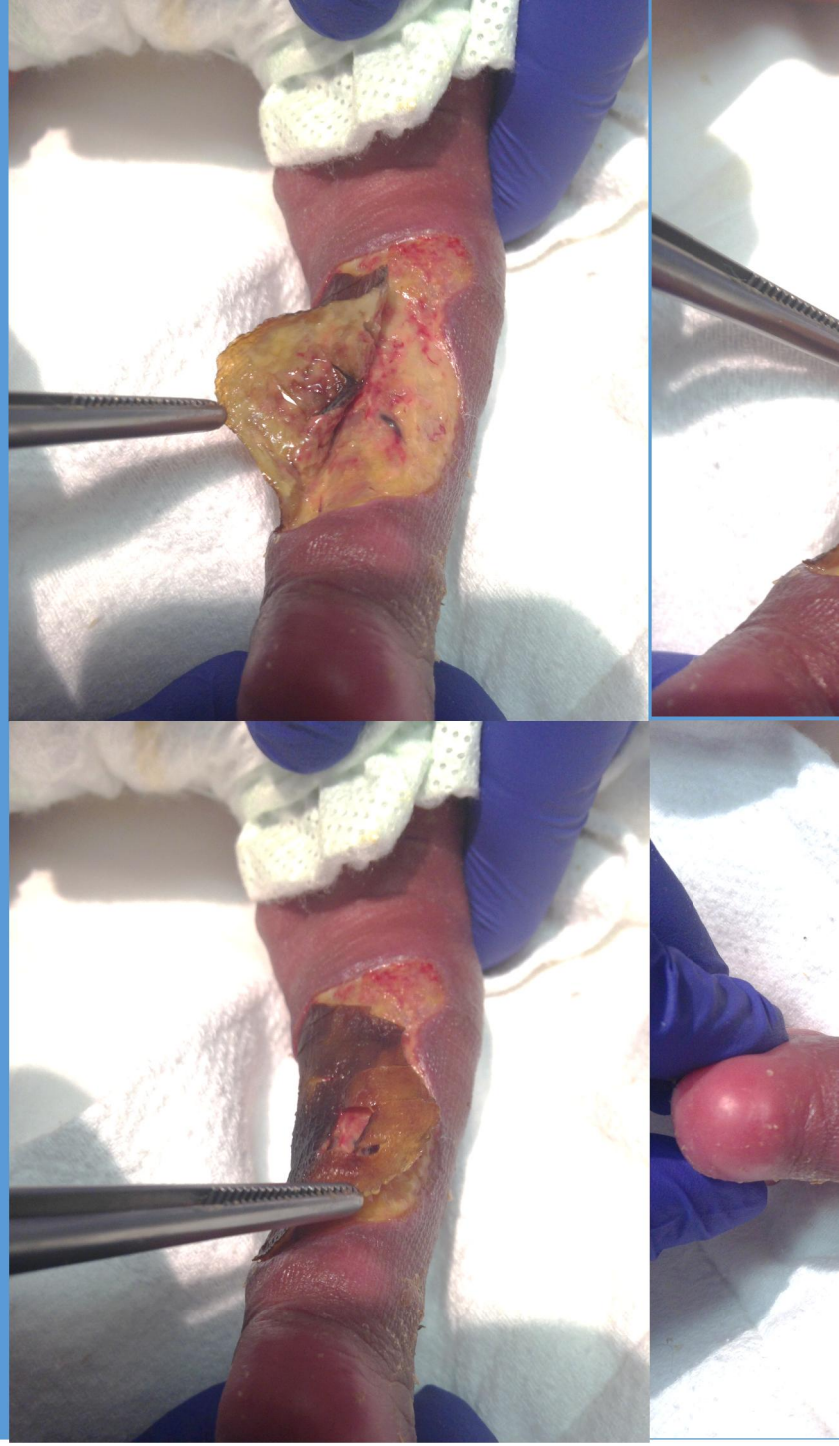


- Crosshatching optimi
  penetration of MGH
  wound beds.
- The procedure usuall
  place on day 5-6 afte
  initiated.
- The technique is typi
  free since the tissue i
- Bleeding rarely occur
- Nurse assistance is cr
  ensure a safe proced

Debridement - Crosshatching

Debridement – Sharp

- Sharp debridement is the final stage of removing non viable eschar from an IV extravasation injury.
- After preparing wound bed using mechanical debridement, MGH and crosshatching, the final loose eschar is gently removed from the wound bed.



Debridement - Sharp

After eschar has su osshatching of the tissue is important wound

Thereafter, the esc ditional 48-72 hours of ALH

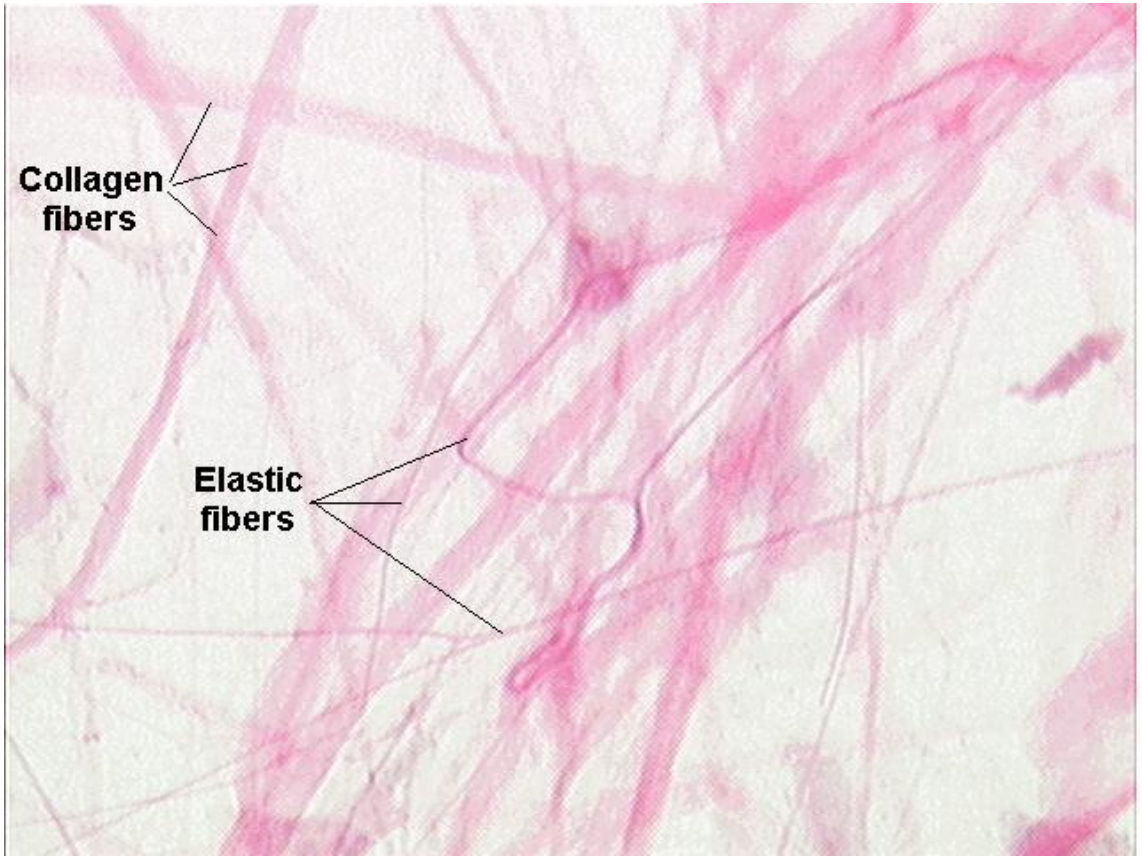
Management – Granulation and Closure

Management – Granulation and Closure

- After careful debridement of nonviable and slough within the wound bed, the phase of management is application of dressings to stimulate closure and gran of the wound bed.
- The type of dressing/intervention is de upon the size and depth of the wound.
- Risk for contractures is directly related management and choice of wound clos debridement.

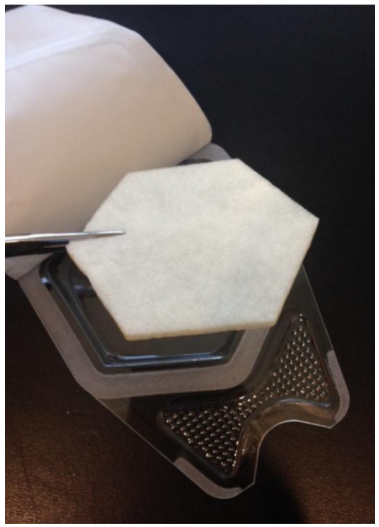
Granulation/Closure – Dressing Options

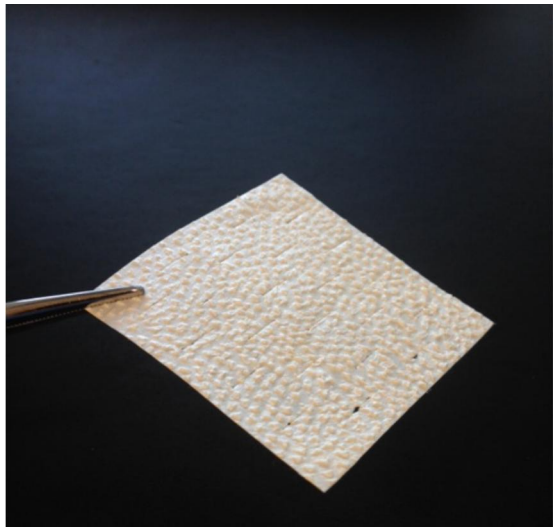
- Collagen dressings
- Placental dressings
- Non autologous sk grafts
- Negative pressure therapy



Collagen Dressing

- Collagen is an abundant fibri protein in the body found in s other connective tissues.
- Collagen dressings facilitate stimulation and deposition of skin within the wound bed m faster than without a dressing
- Collagen dressings are derive sheep, pigs and cows.





Collagen Dressi

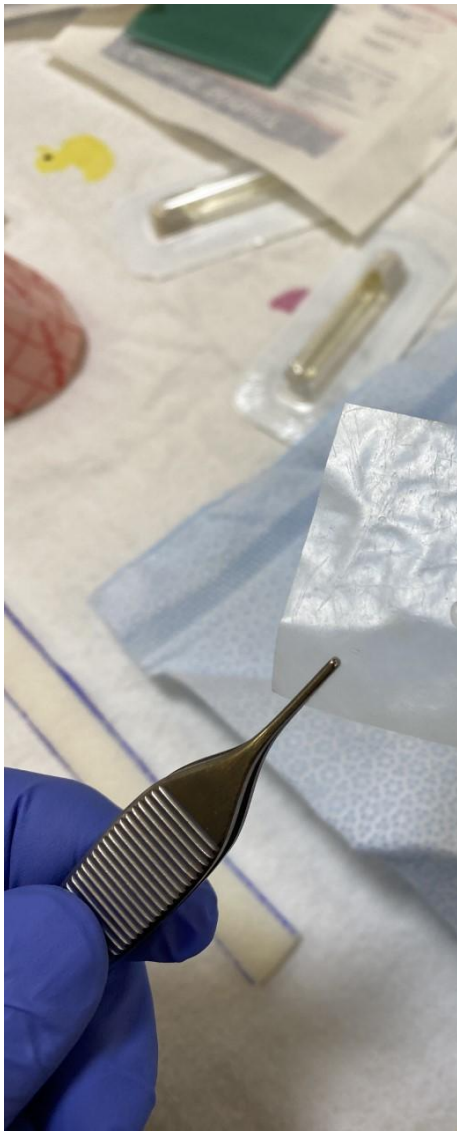
- Stimulate macrophages, an keritinocytes and other gro
- Provide a scaffolding for ho proliferation and migration
- Promote healthier balance inflammatory mediators in
- In general, these dressings changed anywhere from da weekly.
- Require secondary dressing and secure.

Collagen Dressings

- Ideal for smaller IV extravasation injuries
- Larger wounds may require additional time to heal
  - *This increases potential for contractures to arise*.
- Should be applied every 2-3 days for best outcome but may be left in place for up to 7 days.
- No antimicrobial effect – need to monitor for infection
- Simply moisten with saline, cut to approximate size of wound and cover with secondary dressing.

Placental Grafts

- Derived from human placentas
- Composed of collagen and extracellular matrix, biologically active cells and regenerative molecules.
  - Stem cells function to regenerate new cellular materials within the lining of the membrane.
  - Regenerative molecules include fibroblast growth factors, platelet-derived growth factors, metalloproteinases and others.
  - Defensins which protect against bacterial infection.
- Increases and enhances the wound healing process
- Easy to apply
- Safe in neonates
- Expensive
- Contractures seen in personal experience.

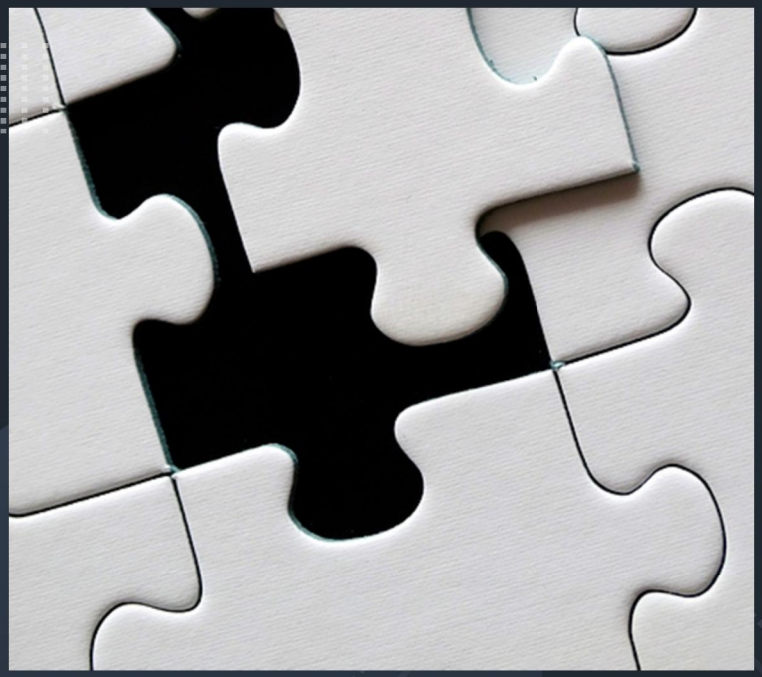




Placental Grafts

Nonautologous Skin Grafts

- Human-derived skin graft (cadaver)
- 99% DNA-free – no concerns for tissue rejection
- Biocompatible while retaining native growth factors, collagen, and elastin preserving natural structure
- Replaces the damaged extracellular matrix so living cells can flourish
- Supports angiogenesis with the presence of vascular-like channels present prior to application

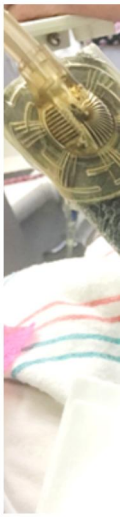


Nonautologous Skin Grafts

- Easily applied, no surgery required -
- place for 7-10 days.
- Ideal for larger wounds > 1 x 1cm, t
- “puzzle piece”
- Excellent outcomes

Role of Negative Pressure Therapy

- Following effective debridement, negative pressure therapy (wound vac) is occasionally utilized on deeper wounds to improve aesthetic outcome.
- NWT will facilitate filling in the tissue deficit “pot hole” so that subsequent dressings applied to granulate the wound will have better outcome.
- Treatment for 5-7 days is usually more than sufficient.



Complications

Complications of Extravasation Injuries

Parents should be advised that four comp
are possible with any IV extravasation inj

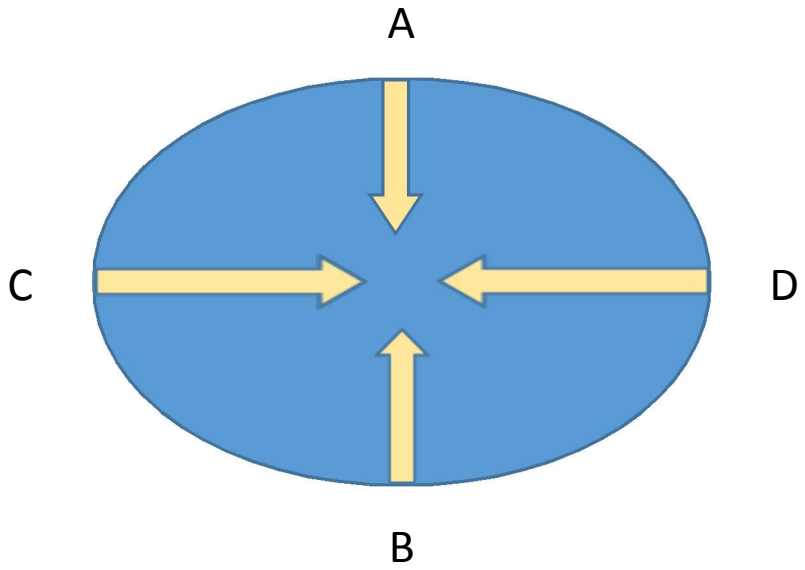
- Contracture– tightness of the skin a
  wound resulting in reduced range o
- Scar formation – the appearance of
  may not resemble normal skin adja
  the wound.
- Infection – any open wound has a ri
  infection
- Neurovascular injury – deeper woun
  result in damage to nerves and vein
  resulting in altered perfusion or pos
  sensory/motor deficits

Discussion of complications should be pa
medical record.

Contractures
Important for Medical Legal Purposes

Contractures – Complications from Granulati

Larger sized wounds (greater than 2 x 2 cm) are at increased the risk for a contracture based on the wound's attempt to close and approximate the e



Deep wounds – Another risk for contract

- In addition to large wounds, deep wounds also increase the risk for contractures.
- Increase in the depth of the wound will also predispose to contracture and poor aesthetic/functional outcome.
- Choice of dressing will depend on depth of the wound bed.
- > 3mm in depth usually will require additional intervention (negative pressure)

Illustrative Cases

2 w/o 23-week premature infant female


2-7-17


10
11
12
13
14
15
16
DATE
IENT NAME
2/15/17
WIDTH
DEPTH


8
9
10
11
PATIENT NAME
WOUND SIZE
LENGTH
eserve.

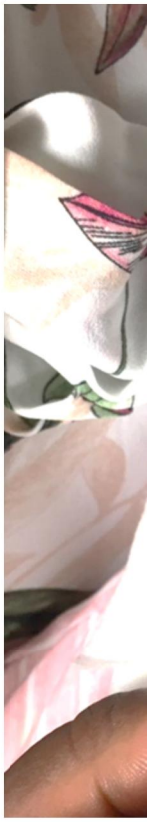

PATIENT NAME
3/6/17


PATIENT NAME
2/6/17
WOUND

3 w/o 27-week premature female

4 w/o 30-week premature infant male

2 m/o 25 week premature infant female



30 d/o 27 week premature infant female

Quiz

Which of the following is not a prognostic feature for complications from an IV extravasation?

A. Swelling/Edema
B. Color
C. Location
D. Size

Hyaluron
been sh
extremely
prev
complicat
extravasa
in ne

True c

Among the following conditions, which fou
potential complications of an IV extravasatic
should family members be advised of early

Which of the following is not a crit
component to document when an
extravasation is identified?

A. Time/Date the injury was identi

B. What was infusing at the time o
injury

C. Name of the individual responsi
the

injury.

D. Location of the catheter

E. Wound description of initial fin

Heel warmers should be applied early in the management of all IV extravasations.

True or False?

It is best not the t
parents when a
extravasation inju
occurred. Wait fo
doctor to advise
parents.

True or False

Questions?

Thank you!

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