Peri-operative Care of patient with Open Fracture

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Concept of Open Fracture

- High energy trauma
- Extent of soft tissue injuries determines the outcome:
  - Vascularity of local tissues including bone
  - Contamination
- Early phase of management
  - 1st treatment of soft tissue trauma with contamination
  - 2nd treatment of skeletal injury

Treatment Goals for open Fracture

- Open fractures are considered a surgical emergency. Every effort is made to obtain formal surgical treatment in a timely fashion to reduce the risk of infection.

Treatment Goals for open Fracture

- To preserve life
- To prevent infection
- To allow fracture to heal
- To restore function in the injured limb

Peri-operative Care of patient with Open Fracture

- Pre-operative (Immediate Pre-operative)
- Intra-operative
- Post-operative (PACU)

Nursing Considerations

- Dire Emergency Polytrauma
  - Patient from A&E Department
  - Patient from CT Room
- Stabilized Polytrauma
  - Patient from ICU
  - Patient from Orthopaedic Ward

Pre-operative Nursing Considerations

- Emergency message from A&E
  - Communication
  - Planning
  - Guidelines & Protocol

Pre-operative Nursing Considerations

- Theatre arrange/set up
  - Availability of theatre
  - Size of theatre
  - Operation table
  - Availability of equipments & instruments
  - Manpower

Pre-operative Nursing Considerations

- Procedure preparation
  - Neuro procedure
  - Abdominal procedure
  - Chest procedure
  - Orthopaedic procedure

Pre-operative Nursing Considerations

- Anaesthetic implications
  - Treat life threatening conditions
  - Prevent hypovolemic & hypothermia
  - Maintain basic life requirement

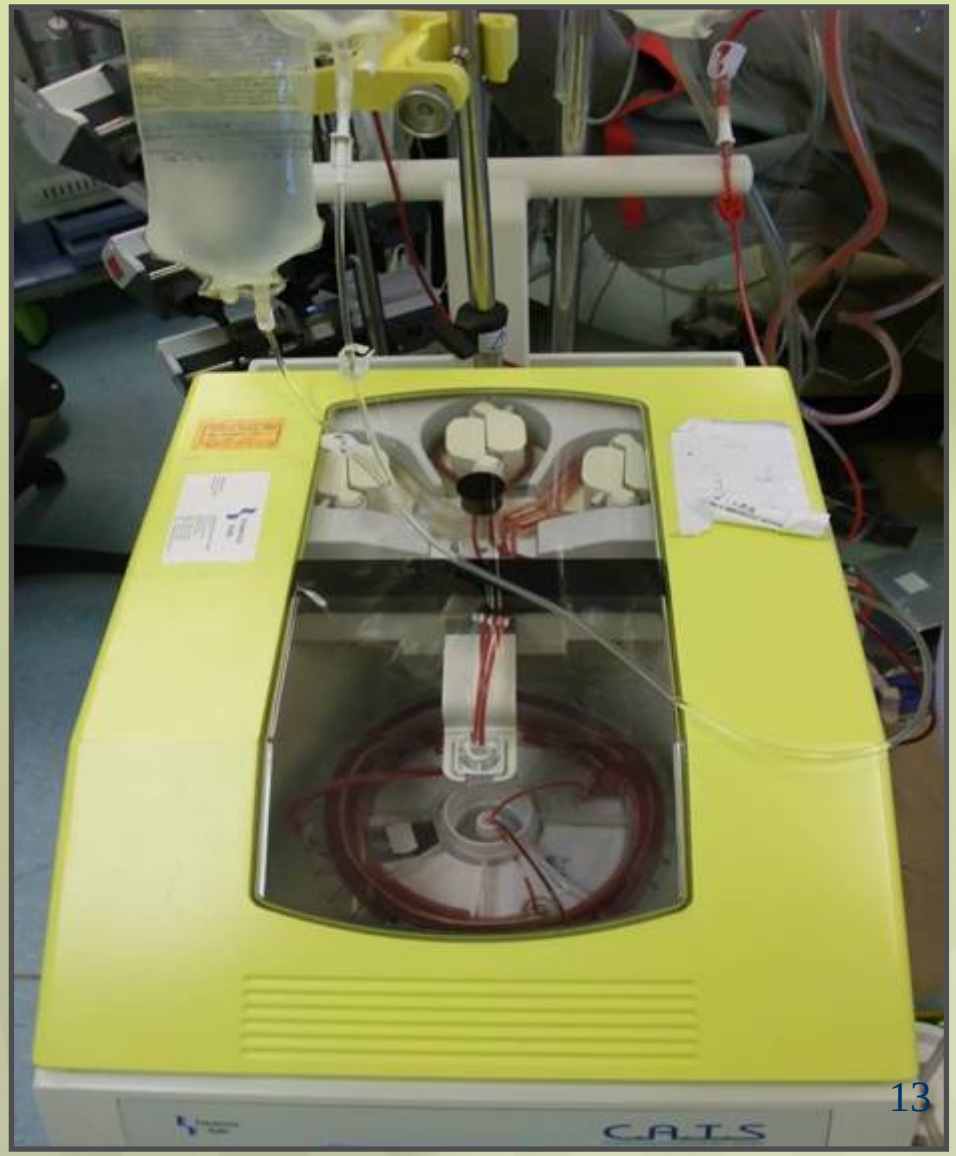
Pre-operative Nursing Considerations

- Anaesthetic Preparations
  - Anaesthetic machine
  - Arterial line, central line, CVP, IV lines
  - Rapid infusion pump
  - Mass transfusion trolley
  - Crash cart

Pre-operative Nursing Considerations

- Anaesthetic Preparations
  - Optical fiber – Flexible Bronchoscope
  - Cell saver machine
  - Blood warmer
  - Warming blanket

Cell saver machine



Cell saver machine

Orthopaedics Procedure

- Management of open fracture:
  - Initial surgical debridement
  - Stabilization of bone
  - Definitive wound management

Orthopaedics Procedure

- Initial Surgical Debridement
  - Removal of all nonviable & contaminated tissue
  - Fasciotomy maybe needed
  - Tendons should be preserved
  - Remove free cortical bone pieces
  - Major vessel injuries
  - Lavage with copious amount of saline

Nursing Preparation

- Basic orthopaedics instrument
- Nerve Repair Set
- Micro-vascular instrument
- Microscope/Loupes
- Pulsatile lavage system
- 3000cc saline
- Suction bottles
- Buckets

Definitive Vascular Repair

Orthopaedics Procedure

- Stabilization of bone

  (After irrigation & debridement)

  - Internal fixation
    - IM nailing (Lower Limbs)
    - Screw & Plating (Upper Limbs)
  - External fixation
    - May be temporarily
- Amputation
  - Nonfunctional or life-threatening limb

Management of bone defect

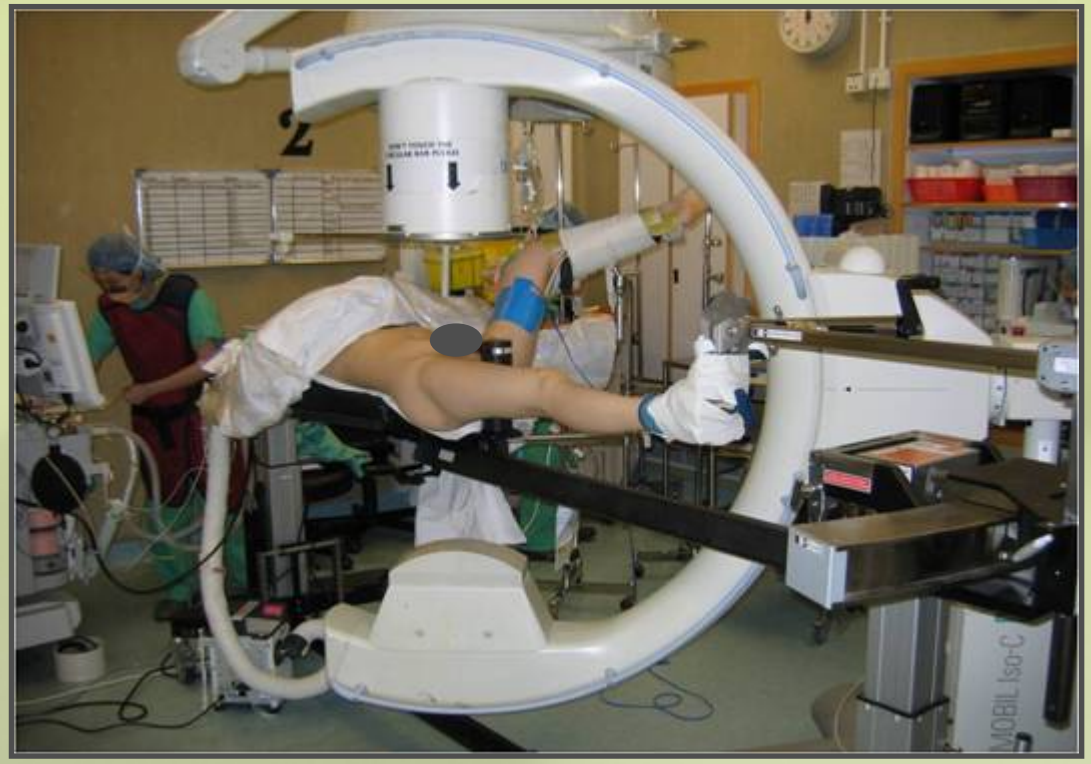
- Bone Grafting (Later stage)
  - Autogenous bone graft
  - Allograft
  - Vascularized bone graft
  - Bone graft substitutes

Nursing Preparation

- Environment
  - Radiolucent operation table
  - X-ray technician & machine
  - Plaster technician
- Fixation instruments

  (Confirmed with surgeon)
- Power instrument
- Bone graft instrument

Fluoro Machine System



Nursing Preparation

- Use sharp drill bit & clean drill bit after use
- Do not soak or clean the components or instrument with saline
- Careful handling of tiny and loose parts, nuts and washer
- Record down the used components

Orthopaedics Procedure

- Definitive wound management
- Primary closure by suture
- Primary closure with split thickness or full thickness grafting
- Biological dressings
- Delayed primary closure by suture
- Delayed skin graft or flap
- Secondary closure

Nursing Preparation

- Skin graft instrument
- Free flap surgery instrument
- Micro-vascular instrument
- Microscope
- Gentamycin beads

Free Flap Surgery

Intra-operative Nursing Considerations

- Maintain patient safety
- Continuous patient care
- Documentation
- Communication
  - Multidisciplinary team approach
  - Surgeon changes plan
- Arrangement of manpower

Immediate Post-operative Nursing Measures for patient with Micro-vascular Surgery

Immediate Post-operative Nursing Measures

- Environment control
  - assign area dedicated for patient after micro-vascular surgery
  - regulate temperature (26 – 28^{o}C)
- Hourly monitoring of flap parameters (Peripheral limb circulation Chart)
- Avoid any pressure on the flap
- Elevate the operated limb

Specific Care in PACU

- Maintain an optimal environment
- Quiet and warm area (Temperature round 26-28^{0}C)

Plastic curtain

Overhead heater

Specific Care in PACU

- Tips in setting up the warm area:
  - Inform the PACU nurse once there is a micro-vascular surgery
  - Using the clips to seal up the gap between the two plastic curtains

Specific Care in PACU

- Equipments required:
  - Overhead heater x 2
  - Monitors

- Monitor the room temperature
  - Inside the warm room (26ºC)
  - Outside the warm room (21ºC)

Specific Care in PACU

- Hourly monitoring of the flap/digit parameters using the Peripheral limb circulation chart

DEPARTMENT OF ORTHOPAEDIC & TRAUMATOLOGY (PWH)
PERIPHERAL LIMB CIRCULATION CHART

Site : _____
Control Site (use red pen) : _____
Observation Frequency (use ✓): Q1/2h _____; Q1h _____; Q2h _____; Q4h _____
Signature (_____) (_____) (_____) (_____)

Patient's label

Temp. (Graph Form) Date :
Room Temp.: 24-26℃

℃ \ Time																									
Inform doctor if 1 Temp. of reconstructed part drop > 3 ℃ from previous hour. 2 Temp. difference > 3 ℃ from control. 3 Temp. drop trend in consecutive 3 hours. 4 Temp. < 30 ℃	≧ 38℃																								
	37℃																								
	36℃																								
	35℃																								
	34℃																								
	33℃																								
	32℃																								
	31℃																								
	30℃																								
	≦ 29℃																								
Colour	Purple																								
	Red																								
	Pink																								
	Cyanosed																								
	White																								
Capillary Filling	Rapid																								
	Normal																								
	Sluggish																								
Tissue Turgor	Tense																								
	Normal																								
	Flaccid																								
Sensation	Normal																								
	Numb (no)																								
Position of Limb (angle of elevation)	60°																								
	30°																								
	lie flat																								
	others :_____																								
Urine Output (For O.T. use)	Urine output Q1h (Inform if < 50 C.C.)																								
	Signature																								

Specific Care in PACU

- Four parameters:
  1) Temperature
  2) Colour
  3) Capillary refill
  4) Pulp turgor

DEPARTMENT OF ORTHOPAEDIC & TRAUMA

PERIPHERAL LIMB CIRCULATIO

Site : _____

Control Site (use red pen) : _____

Observation Frequency (use ✓): Q1/2h _____; Q1h _____; Q2h _____; Q4h

Signature (_____) (_____) (_____)

Temp. (Graph Form)	**Date :**											
Room Temp.: 24-26℃	**℃ \ Time**											
Inform doctor if	**≧ 38℃**											
	37℃											
1 Temp. of reconstructed part drop > 3 ℃ from previous hour.	**36℃**											
	35℃											
	34℃											
2 Temp. difference > 3 ℃ from control.	**33℃**											
	32℃											
3 Temp. drop trend in consecutive 3 hours.	**31℃**											
	30℃											
4 Temp. < 30 ℃	**≦ 29℃**											
Colour	**Purple**											
	Red											
	Pink											
	Cyanosed											
	White											
Capillary Filling	**Rapid**											
	Normal											
	Sluggish											
Tissue Turgor	**Tense**											
	Normal											
	Flaccid											
Sensation	**Normal**											
	Numb (no)											
Position of Limb (angle of elevation)	**60°**											
	30°											
	lie flat											
	others :_____											
Urine Output (For O.T. use)	Urine output Q1h (Inform if < 50 C.C.)											
	Signature											

Normal and Abnormal Circulatory Signs for the flap

	Colour	Pulp turgor	Capillary refill	Temperature
Normal	Pink	Full	1-2 seconds	Warm
Arterial Insufficiency	Pallor Cyanotic	Hallow Prune-like	Slow >2 seconds	Cool
Venous Congestion	Red Purple	Tense	Fast <1 seconds	Cool

Specific Care in PACU

- Obtains the first parameters reading by both the chief surgeon and PACU nurse

  (Take it as the valid baseline)

Specific Care in PACU

- During discharge, perform circulation monitoring together with the ward nurse (Minimize the discrepancy)

Thank you