Fractures Of The Tibia & Fibula

INTRODUCTION

- A twisting force causes a spiral fracture of both leg bones at different levels; an angulatory force produces short oblique fractures, usually with a separate triangular ‘butterfly’ fragment.
- Because of its subcutaneous position, the tibia is more commonly fractured, and more commonly sustains an open fracture, than any other long bone.
- Direct injury may crush or split the skin over the fracture; this is a **high-energy fracture** and is often from a motorcycle accident.

INTRODUCTION

- Indirect injuries are **low energy**; with a spiral or oblique fracture, one of the bone fragments may pierce the skin from within.
- Lower 3rd of the tibial fracture tend to heal slowly.

CLINICAL FEATURES

- The limb should be carefully examined for bruising, severe swelling, crushing or tenting of the skin, an open wound, weak or absent pulses, diminution or loss of sensation and inability to move the toes.
- Always be on the alert for signs of an impending compartment syndrome.

X-RAYS

- The entire length of the tibia and fibula, as well as the knee and ankle joints, must be seen.

Management

The main objectives are:

- To limit soft-tissue damage and preserve skin cover.
- To obtain and hold fracture alignment.
- To recognize a compartment syndrome.
- To start early weightbearing (loading promotes healing).
- To start joint movements as soon as possible

TREATMENT OF LOW-ENERGY FRACTURES

- If the fracture is **undisplaced** or minimally displaced, a full-length cast from upper thigh to metatarsal necks is applied with the knee slightly flexed and the ankle at a right angle.
- A **displaced fracture** needs reduction under general anesthesia with x-ray control before cast application. The limb is elevated and the patient is kept under observation for 48–72 hours.
- Patients are usually allowed up (and home) on the second or third day, bearing minimal weight with the aid of crutches.

TREATMENT OF LOW-ENERGY FRACTURES

- After 2 weeks, the position is checked by x-ray.
- With stable fractures, the full-length cast may be changed after 4–6 weeks to a functional below knee cast or brace which is carefully moulded to bear upon the upper tibia and patellar tendon. This liberates the knee and allows full weightbearing.

TREATMENT OF LOW-ENERGY FRACTURES

Indications for skeletal fixation

- In hospitals where experience and facilities for operative skeletal fixation are lacking, nonoperative treatment is not only feasible but positively desirable. It allows for a shorter period of hospitalization, but follow-up is more frequent and prolonged.
- Where appropriate skills and facilities are available, tibial shaft fractures can be surgically fixed. Indeed, many surgeons would hold that unstable fractures, even of low-energy type, are better treated by skeletal fixation..

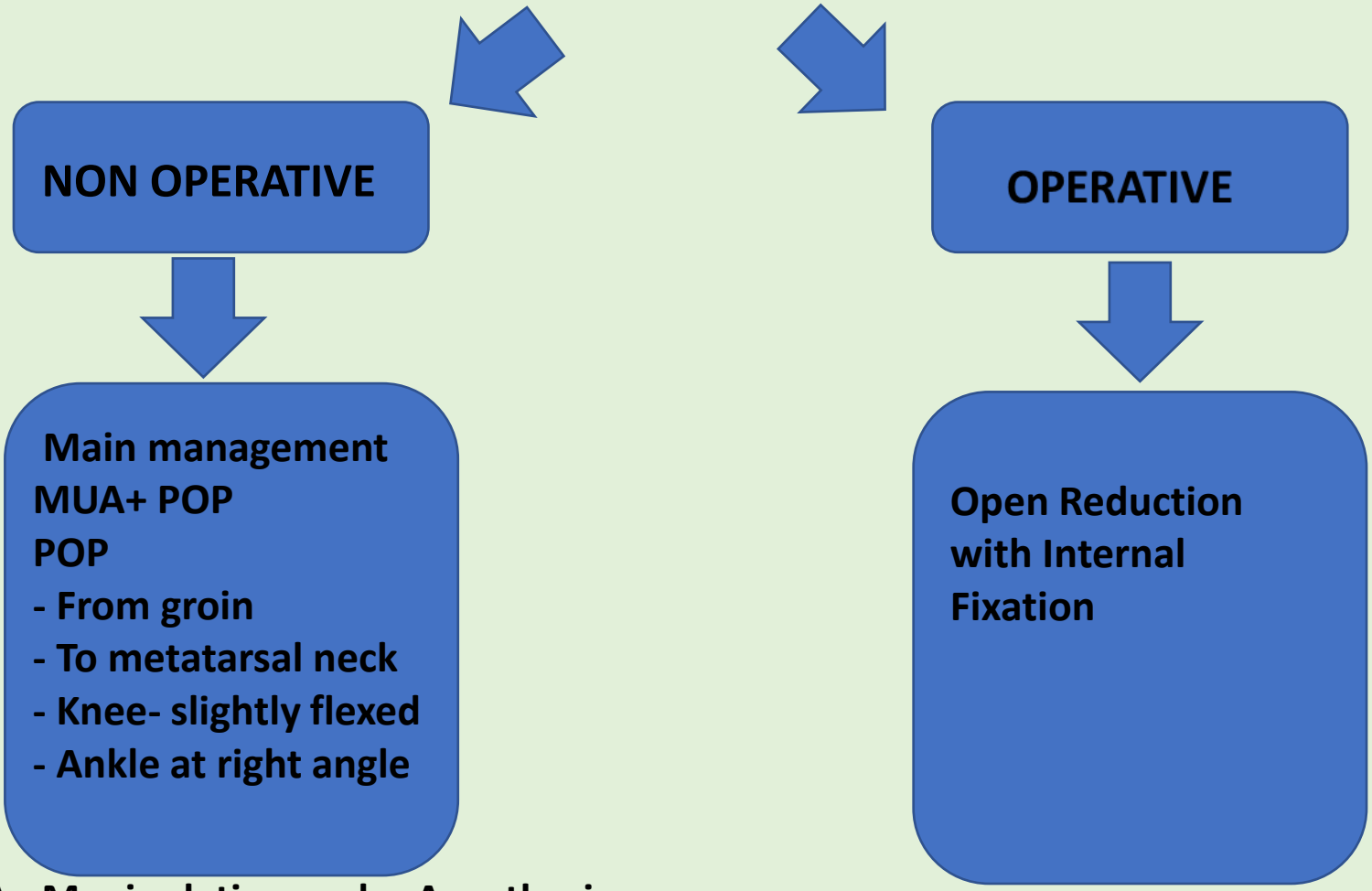
TREATMENT OF HIGH-ENERGY FRACTURES

- Initially, the most important consideration is the viability of the damaged soft tissues and underlying bone.
- Tissues around the fracture should be disturbed as little as possible, and open operations should be avoided unless there is already an open wound.
- The risk of **compartment syndrome** prevails in the **first 48 hours.**

TREATMENT OF HIGH-ENERGY FRACTURES

- In keeping with the principle of inflicting as little surgical damage as possible to a limb that is already badly injured, **external fixation** offers several advantages as the method of choice for stabilization.
- **Intramedullary nailing** is an alternative, but may be difficult

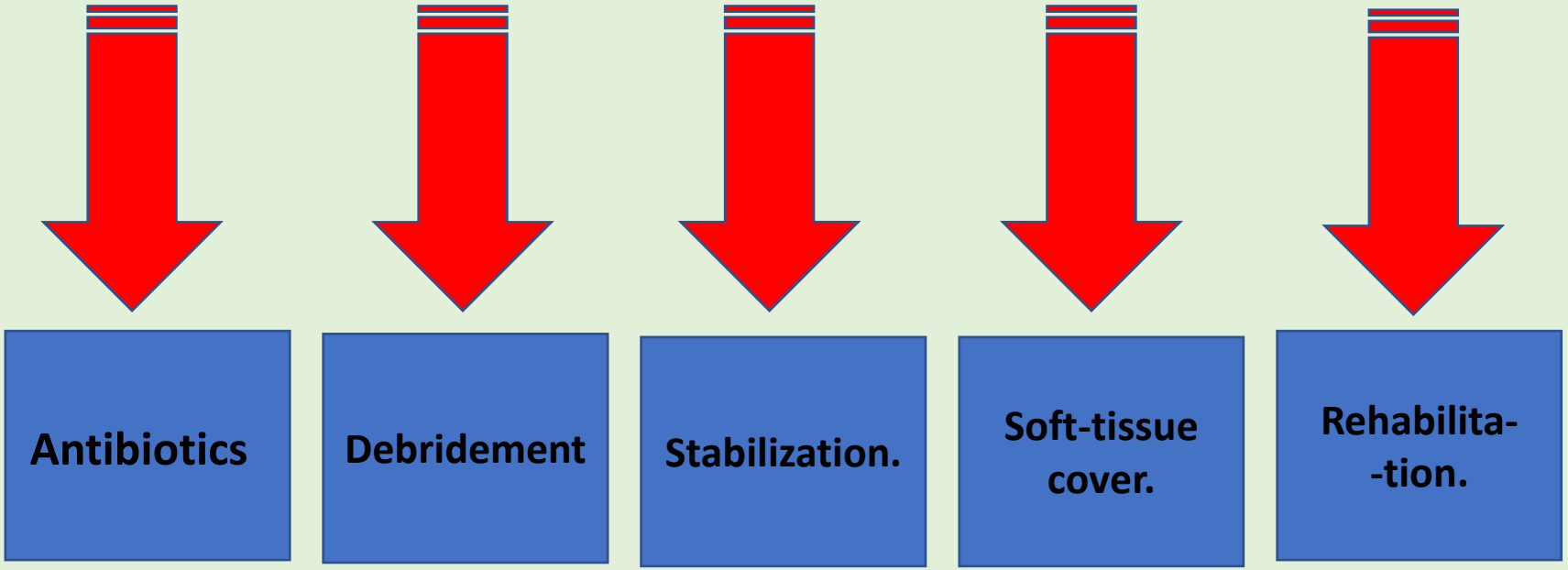
TREATMENT SUMMERY



MUA –Manipulation under Anesthesia

TREATMENT OF OPEN FRACTURES

- There is a risk of deep infection and chronic osteomyelitis.
- A suitable regimen for the treatment of open tibial fractures comprises following…..



TREATMENT OF OPEN FRACTURES

- Antibiotics are started immediately and are continued for a full therapeutic course, which is 3 days. A broad-spectrum cephalosporin with an aminoglycoside, such as gentamicin, are used together to cover Gram-positive and Gram negative bacteria.
- Full wound assessment is done in the operating theatre and not the emergency department.
- Ideally, the debridement should be carried out with a plastic surgeon.

TREATMENT OF OPEN FRACTURES

- Repeat debridement may be necessary, but exposed bone should preferably be covered within 5 days of the injury.
- Fracture stabilization may be achieved by several methods depending on the energy of injury; external fixation is favoured for the more severe one.

COMPLICATIONS

1.Vascular injury

- Fractures of the proximal half of the tibia may damage the popliteal artery. This is an emergency of the first order, requiring angiograms, exploration and repair.

2. Delayed union and non-union

- High-energy fractures and fractures associated with bone loss or deep infection are slow to unite and liable to non-union. **Bone grafting** may solve some ‘slow’ unions; in others, a different mode of fixation may be needed.

COMPLICATIONS

3. Compartment syndrome

- Tibial fractures – both open and closed – and intramedullary nailing are the commonest causes of compartment syndrome in the leg.
- Heightened awareness is all! Early warning symptoms are **increasing pain** and a **feeling of tightness** or ‘bursting’ in the leg.
- **Numbness** in the leg or foot, and **absent pulses** are worrying late signs.

COMPLICATIONS

3. Compartment syndrome…..

- The diagnosis can be confirmed by measuring the **compartment pressures in the leg** and may be the only means of assessment in patients with reduced consciousness or those who are intubated.
- However, strong clinical suspicion must over-ride any numerical figure obtained by the pressure monitoring. Once the diagnosis is made, **decompression by open fasciotomy** should be carried out **with the minimum delay**.

COMPLICATIONS

4. Infection

- Open fractures are always at risk; even a small perforation should be treated with respect, and debridement carried out before the wound is closed.
- With established infection, skeletal fixation should not be abandoned if the system is stable; infection control and fracture union are more likely if fixation is secure. However, if there is a loose implant, it should be removed and replaced by external fixation.

COMPLICATIONS

Malunion

- Slight shortening (up to 1.5 cm) is usually of little consequence, but angulation should be prevented at all stages.
- The normal ankle compensates more readily for a valgus deformity than for a varus one; however, anything more than 7 degrees in eitherplane is unacceptable.
- Malunion nearer the ends of the tibia is more likely to lead to early osteoarthritis.
- Deformity, should be corrected by tibial osteotomy.

COMPLICATIONS

Joint stiffness

- Prolonged cast immobilization is liable to cause stiffness of the ankle and foot, which may persist for 12 months or longer in spite of active exercises.
- This can be avoided by changing to a functional brace as soon as it is safe to do so, usually by 4–6 weeks.