

# Venous Leg Ulcer Due To High Pressure Femoral Splint in Closed Femoral Shaft Fracture: A Case Report

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## 1. Background

Injuries to the musculoskeletal system occur in many patients over the world.<sup>1</sup> The global burden of injury increased and predicted to be a leading cause of death and disability over the next few decades. In 2017, injuries ranked 6<sup>th</sup> in causes of early death and the number increased from 1990s.<sup>1</sup> The seminal *Global burden of disease and risk factors* study estimated that injuries accounted for more than 15% of all ill-health in the world in 1990 and forecast this would be in 10 major causes of early death worldwide by 2040<sup>1</sup>. A document by WHO highlights that more than 5 million people die each year as a result of injuries. Injuries account for 9% of the world's deaths, nearly 1.7 times the number of fatalities that result from HIV/AIDS, tuberculosis and malaria combined.<sup>2</sup>

More than 90% of injury deaths occur in developing countries, where the health-care systems are least prepared to meet the challenge<sup>3</sup>. People in developing countries often used traditional medicine as primary health-care rather than conventional medicine, which sum of the knowledge, skill and practices based on culture, theories, beliefs and ancestor's experiences. According to Indonesia Research and Development Center, in 2013, 30,4% households used traditional medical services as their primary health-care.<sup>4</sup> The bone setter (TBS) is one of traditional medical services available in developing countries. They help people suffer musculoskeletal problems such as fracture, dislocation, bruises, or ligament sprain. Their treatments include massage, traction and splinting.<sup>5</sup> Warman PL., *et al* report the most common fracture sites treated by TBS in West Java is femoral fracture (37.61%).<sup>6</sup>

Orthopedic trauma care and fracture management have significant advanced over decades. Fracture reduction and stabilization with splinting were initial standards and used in Emergency situation. The goal of initial fracture immobilization is to realign the injured extremity in as close to anatomic position as possible and to prevent excessive fracture-site motion.<sup>7</sup> Although, plaster for splinting is safe, there is certain complication that caused by splinting. These are tight cast, pressure sores, abrasion or laceration of the skin and loose cast. We report an unusual complication, venous leg ulcer in Closed Femoral Shaft Fracture managed by bone setter. This caused by excessive pressure on applying fabric bandage with logs in closed femoral shaft fracture.

## 2. Case Scenario

A 20 year-old female presented to the emergency department with a closed femoral shaft fracture and a grossly open wound with death tissue and sludge distal to fracture site. She complained pain and stiffness on her affected limb. She was haemodynamically stable. Four weeks before, she had a motorcycle crash, her thigh got injured, she heard a "crack" sound and could not move her thigh. There was no open wound on her affected limb. She initially treated and managed by traditional bone setter in Bogor. The healer said he got a fracture. She was given traditional meds, massage, traction and her thigh was wrapped with fabric bandages and a pair logs at her medial and lateral side. (picture 1). After that, she fully bed rest at home and rarely moved her limb.

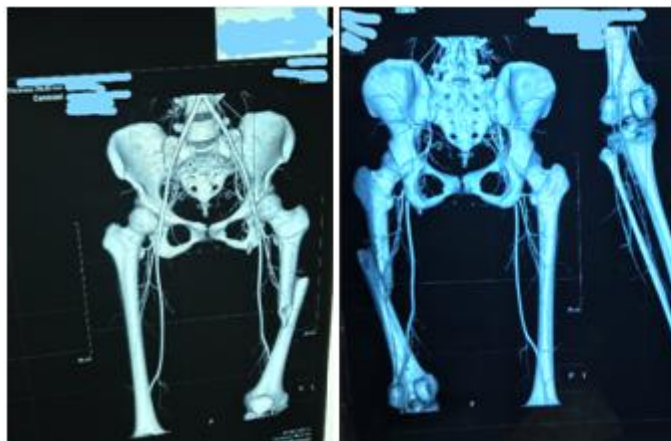


**Picture 1:** Clinical Appearance the wound. We can see tight bandages had applied on patient thigh

The Physical examination in emergency department revealed a big ulcer on her lateral side of calf. The wound was approximately 18 cm in diameter, covered with death tissue and sludge. There was a deformity on her thigh and her affected limb to be shortened compared to the other limb. There was a distinct tenting of the tissues on mid thigh but no open wound was present. All the lower limb compartments were tight but no signs of compartment syndrome. Distal pulses were present and the capillary refill time was 3s. there was no neurological deficits. she could move all the fingers and ankle but she was unable to raise her leg. There were no abnormal values on laboratory examination. Radiographs revealed a complete 1/3 mid femoral shaft fracture with a callus formation at the fracture side (picture 2). Angiograph was performed to see any vascular compromise, and the result for arteries system was good (picture 3).



**Picture 2:** Radiograph Ap/Lateral femur, tibia, and fibula show a complete fracture mid shaft femur sinistra



**Picture 3:** Angiograph show there is no insufficient arteries on lower extremity affected side.

The patient received an Intravenous Ceftriaxone and Analgesics drugs in the emergency department and she was planned to have an ORIF-surgery and debridement on the next day. The wound was dressed and the leg was re-splinted to decrease the pressure on her thigh.

In the operating room, after skin cleaning, we covered the wound with a sterile drape to separate surgical field with the contaminated wound. The fracture was stabilized with internal fixation plate and screw, lateral skin incision approach. After skin closure procedure was done, we covered the surgical wound with a sterile drape and then we advanced to debridement the contaminated wound. The dead tissues and nonviable skin edges were debrided and removed. The wound was irrigated with 6 L of normal saline solution via

pulse lavage, then the wound was dressed with compression dressing.

Post-operative instructions advised for early mobilisation and continued administer the antibiotics. In the days following, we observed she began experiencing increasing pain in the lower leg and her wound were noted to be healthy with no evidence of infection. We stop administer the antibiotics on 2<sup>nd</sup> post-operative day. We changed the wound dressed every morning. The patient was discharged home on postoperative day 3 and was followed up in the outpatient department.

### 3. Discussion

Femoral shaft fractures are commonly seen as a result of high-speed road traffic accidents.<sup>8</sup> The fractures can be immobilized temporarily with traction splint. The traction 's force is applied distally at the ankle. Before applying the splint, place cotton padding material over the legs to allow for swelling and avoid excessive soft tissue pressure by the logs. Excessive traction and splinting can cause soft tissue damage.<sup>7</sup>

Venous leg ulcers are result from the consequences of dysfunctional circulation. it is caused by unrelieved high pressure in the veins of the calf. High venous pressures cause the circulation in the veins transmit back to the capillaries. this condition results venous stasis, increasing permeability, leakage and deposition haemosiderin in the skin changing its elasticity (lipodermatosclerosis). Lipodermatosclerosis has been associated with leucocytes and other substances trapping and tissue hypoxia predisposing skin to cell death and ulceration.<sup>9</sup>

The goal of orthopaedic intervention in this patient is to obtain fracture stabilization, provide optimal wound care and early patient mobility. Fracture stabilization facilitates the patient to move her limb, improves pain control, avoid muscles contracture. Although, internal fixation is best done when wound colonization is lowest, to minimizes the risk of infection.

In this case, we believe the venous leg ulcers is caused by some factors such as excessive traction, high pressure on splinting and immobilised patient. Fracture stabilization provides early patient mobility and avoids muscle contracture. Thus, the muscle pump function could improve the circulation in veins.<sup>10</sup> The compression dressing therapy is recommended to treat patient with venous leg ulcer. Compression promotes venous and lymphatic return, improves microcirculation and reduces inflammation. Applying compression dressing should be supervised by adequately trained nurses. There is specific range of graduated compression pressure, highest at the ankle.<sup>11,12,13</sup>

### 4. Conclusion

The management fracture conducts by the bone setter may not be an effective treatment for femoral fractures. Moreover, this increases the risk of complication in femoral fractures.

Although an uncommon complication<sup>5</sup>, venous leg ulcer could be happened in closed femoral shaft fracture due to excessive traction and high pressure on splinting. This case has not been formally reported in the literature previously.

Evaluate distal pulses and capillary refill time after applying splinting and suggest the patients to exercise their limb to decrease the risk of complication by splinting.

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