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MINIMUM INCISION PERCUTANEOUS PLATE OSTEOSYNTHESIS FOR DISTAL FIBULAR FRACTURES: A PROSPECTIVE STUDY

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ABSTRACT: Distal fibular fractures are usually comminuted and most of the times osteoporotic especially if they are occurring in females and in geriatric age group. These fractures are usually associated with other fractures, which necessitates them to be fixed accurately. Owing to the fact that distal fragment is subcutaneous with scanty soft tissue over bone, which pose these fracture fixations become difficult by open methods in view of wound healing. A prospective study of 26 patients with distal fibular fractures were treated with MIPPO with hook plate were healed with less complications and better outcome. With this background we suggest a minimally invasive incision over proximal fragment where sufficient soft tissue cover is present. From there pushing the special hook plate subperiosteally to distal fragment, hooking the tip of fibula and fixing the proximal fragment after reduction gives a simple and effective stable fixation.

KEYWORDS: Fibula fixation, MIPPO technique, Lateral malleolus fracture, Distal fibula fracture.

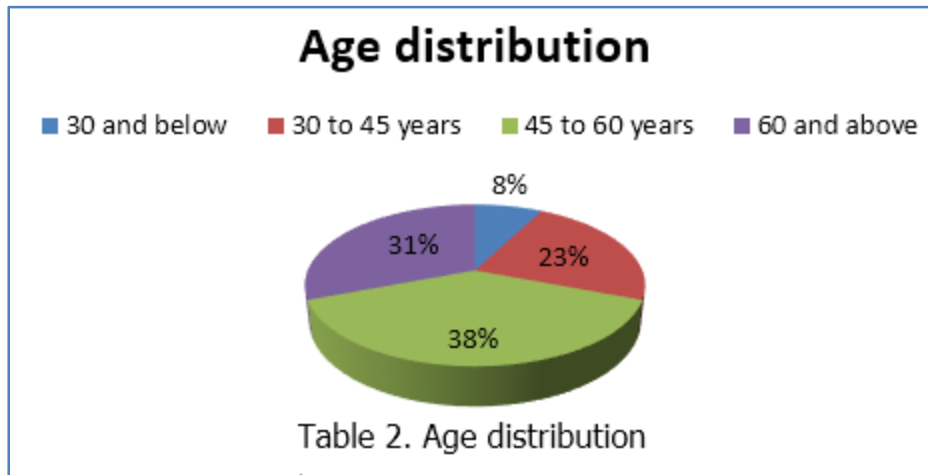
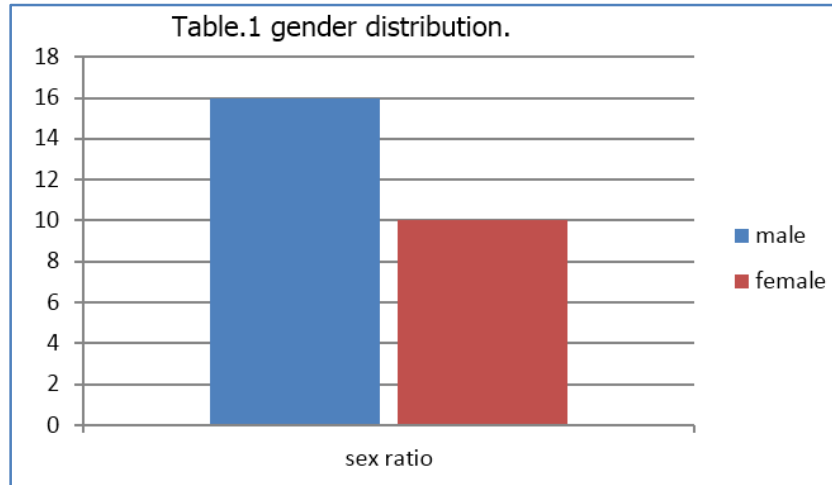
INTRODUCTION: BACKGROUND: Wound problems like non-healing of incision site along with exposure of implants is often seen at distal fibula, especially the soft tissue is also compromised during initial injury or compound wounds.^[1] In geriatric patients and lean patients, the ankle region is with lack of subcutaneous fat gives a stuffing effect during closure of wound after open reduction and fixation with plate and screws, which leads to tension of sutures and wound dehiscence, with consequent complications. We suggest a MIPPO technique for these fractures the fixation without any incision over subcutaneous bone will solve the above problem.

Distal Fibular fractures are often with comminution, either because of old age, osteoporosis or high energy trauma. The stable fixation of these fractures is essential to achieve good reduction of associated tibial fractures.^[2] The tight soft tissues and comminution pose a dilemma either to use plate or intramedullary fixation. Plate being ideal to buttress comminution and closed intramedullary nail is better to avoid soft tissue problems. Larger incisions to insert plates requiring long incisions pose higher complications (Baumgaertel et al., 1998), this disadvantage lead to use biological plate osteosynthesis, among which new surgical technique of minimally invasive plate osteosynthesis gives less soft tissue damage and indirect reduction technique. Our idea to these patients is to use a Minimally Invasive percutaneous osteosynthesis (MIPPO) by using a hook plate, which give a secure fixation without causing extensive exposure or soft tissue tightening also avoiding incision over plate, thus healing problems.

MATERIAL AND METHODS: The prospective observational study was undertaken at Mahatma Gandhi memorial hospital, Warangal during the 2011-2015. Data gathered according to the self prepared proforma, having data at 0, 15, 45 and 90day intervals. The data studied on day 0

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includes gap between tip of fibula and hook of plate, difficulty in getting reduction and any case required open reduction or not. The other 15, 45 and 90 day follow up includes infection, plate exposure, painful bursa over tip of implant and malunion. The patients of both sexes having fracture lateral malleolus below the 7.5cm from the tip of fibula with or without associated medial malleolus fracture were included. A total of 26 patients were studied, among 16 were male and 10 were female patients.



The semi tubular plate was used to make it a hook plate and length was assessed intra operatively under image intensifier. The intra operative difficulties and post-operative outcome was studied till 3 months or up to bone union, whichever is later.

PROCEDURE: The patients with fibular fractures at or below the syndesmosis are selected and a pre-operative planning for length of hook plate is done so as to have three screws proximal to the fracture. After aseptic preparation of limb, a small incision is planned.

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Over the subcutaneous surface of the proximal fibula so as to utilise this window for making a subperiosteal tunnel and also for fixing the three screws to proximal fragment proximal to the fracture.

Through this window a 10mm curved osteotome is passed subperiosteally till the tip of fibula [fig.2].



In to this tunnel hook plate is inserted under c-arm guidance the hook of plate is hooked to the inferior tip of fibula. By manipulating the ankle and fracture ends the fracture reduction is achieved.

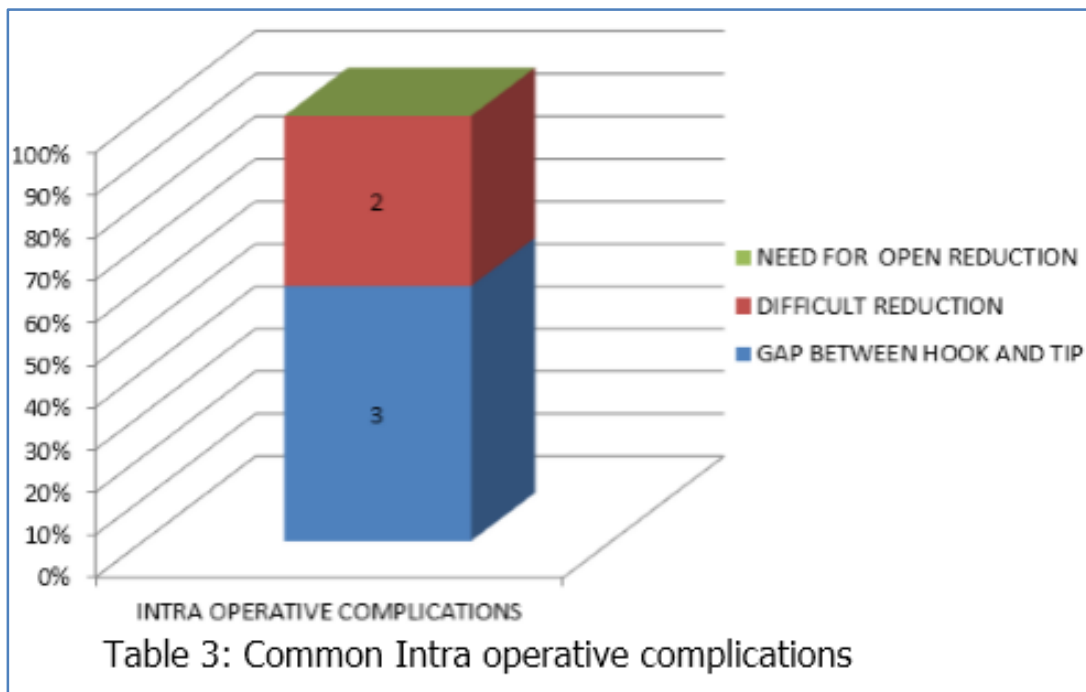
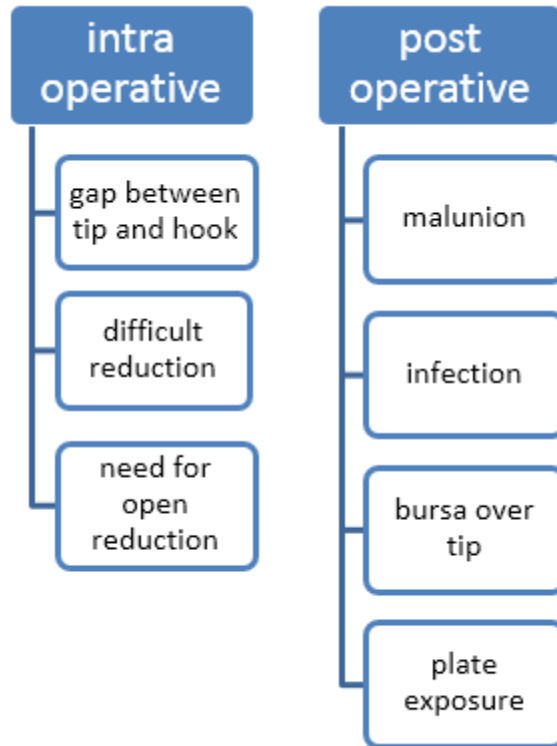


Fig. 3. finished fixation showing relation of proximal fixation, fracture level and tip of fibula.

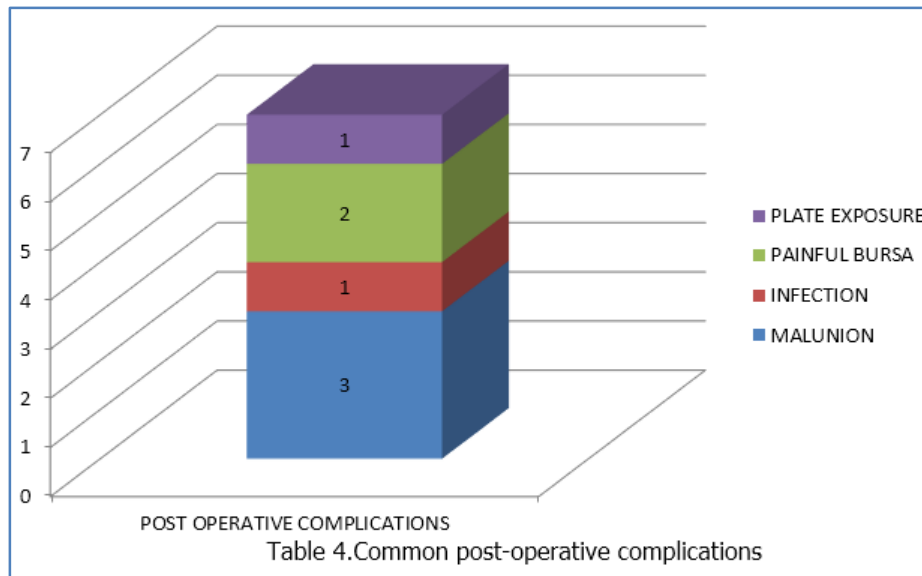
Keeping reduction proximal fragment is fixed to plate with three screws through the open window [fig.3]. Haemostasis is secured and the post-operative care is standard.

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COMPLICATIONS:



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Among Intra operative difficulties gap between tip of fibula and hook of plate, difficulty in getting reduction were common and no case required open reduction. Among post-operative complications malunion, infection, plate exposure, painful bursa over tip of implant were observed.

DISCUSSION: It is a simple procedure and no special instruments are required. The surgical exposure is much less and especially incision is avoided at distal fibula, where the plate exposure is common in open fixations.^[3] Similar technique was described but the entry point is from tip of fibula,^[4] where again the soft tissue cover again a problem and exposes the fracture if the fracture is in lower than syndesmosis. Being the incision is higher up to the fracture site and at soft tissue cover present and the plate is passed subperiosteally, the fracture hematoma is not disturbed or minimally disturbed which gives the added advantage. The hook plate by fixed to the tip of fibula along with proximal screws gives a sufficient stability. The procedure has advantage of early fracture healing and devoid of complications like devitalisation of skin and plate exposure and further the procedure is simple and does not need any special equipment.

CONCLUSION: The minimally invasive (MIPPO) technique is a good option in these difficult fractures giving an early healing advantage and with fewer complications, without compromising stability of fixation. It is a simple procedure and easily reproducible. It is useful in specific group of patients with good clinical scores.

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