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RESEARCH ARTICLE

FIBULAR OSTEOSYNTHESIS WITH CANNULATED HIP SCREW FIXATION OF NEGLECTED FEMORAL NECK FRACTURE IN A YOUNG ADULT: CASE REPORT.

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Abstract

Neglected fracture neck of femur is a challenging condition to treat. Preservation of the head of femur is desirable in young patients.In order to preserve the femoral head in femoral neck non-union in young adults, the preferred option of treatment is open reduction and internal fixation. Where there are no facilities for microvascular surgery, non-vascularized fibular strut grafts can be used with screws. This paper describes the use of fibular strut graft and cancellous screws in the open reduction and internal fixation of a neglected femoral neck fracture associated with avascular necrosis of femoral head in a young adult that was followed up for four years. The use of non-vascularized fibular strut grafts and screws for fixation of non-united fractures of femoral necks, even in the presence of avascular necrosis, could lead to union.It is cost-effective and technically less demanding, and associated with good outcomes.

Introduction:-

Fracture neck of femur is popularly known as, “unsolved fracture.”[6] The choice of treatment depends on the patient age, duration of injury, activity level,extent of displacement, and extent of osteoporosis. The treatment goals are anatomic reduction,stable fixation, preservation of blood supply to the bone fragments, and early active mobilisation to prevent stiffness. Treatment options include valgus osteotomy and osteosynthesis with or without bone grafting (muscle pedicle, free vascularised, or nonvascularised fibula), hemiarthroplasty, and total hip arthroplasty.[1,8] Nonunion and avascular necrosis are common complications. Recent studies have shown improved results with decreased rates of avascular necrosis (AVN) and nonunion.[2,9] But neglected fracture neck of femur still poses a major challenge for the treatment . Barnes et al.[3] showed that the rate of complication significantly increases once the treatment is delayed beyond 1-week. Thus some additional procedure to salvage the femoral head is warranted. For this, there are large numbers of options including osteotomies and bone grafting procedures. The dilemma today is to choose among these options, as the literature is not clear about the ideal treatment.One recognized treatment option is the combined use of open reduction, internal fixation with screws and non-vascularized fibular strut graft. This method is relatively easy to perform, does not require microvascular anastomosis, offsets both the biologic and biomechanical causes of non-union, contributes to the repair of any incidental avascular necrosis, and is not encumbered by the complications of intertrochanteric osteotomy like limping. This was the technique used in the current report for the subject who had a neglected femoral neck fracture and radiological evidence of aseptic necrosis of the index femoral head. His fracture healed after three months and

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he had no evidence of aseptic necrosis. After a follow-up of two years, he had a Harris hip score of ninety seven. The rationale behind this option is discussed and the relevant literature is reviewed. The patient gave his consent for this study.

Case Report:-

A 22 year old man presented to the outdoor patient department of our hospital with complaining of painaround groin , limping, not able to bear weight on right limb for the last 2 months. He had a history of fall from bike 2 months back.He was treated by a local bone setter. On examination affected limb was externally rotated and shortened. Anterior joint line was tender, vascular sign of Narath negative.Range of movement was restricted and painful. Limb length discrepancy by 3 cm. Telescopy test posive.Tendelenberg test could not be elicited. X ray pelvis with both hip AP view 20^0internal rotation was taken. X ray showed displaced #neck of femur with sclerosis of margins, patchy sclerosis of head. Sentons line was broken. His Harris hip score(HHS) was 55. He was admitted and proximal transtibial skeletal traction given for seven days prior to surgery. An anterolateral approach was used to expose the right hip joint and to estimate the required length of fibular strut. Nine centimetres of the mid ipsilateral fibula was harvested subperiosteally through a lateral right leg incision. The graft was prepared by multiple drill holes along its length and nibbling of its interosseous border. Upon exposure of the hip, fibrous tissue and cartilage were noted to be covering the fractured ends. These were curetted off to freshen the ends with the aid of Steinman pins attached to separate the greater trochanter and femoral head as joysticks. The entire neck appeared shorter than normal. The neck was than reamed over the third guide wire using the 8 mm part of the triple reamer. The fibula strut graft was than hammered over the third guide wire .The graft was subsequently introduced into the reamed tract. Two cancellous screws were then used to fix the fracture. Unfortunately, varus could not be prevented because of the extent of neck resorption but the construct was stable . The wound was closed in layers over a suction drain which was removed after 2 days . Boot and bar cast was given.He was advised on strict non-weight bearing for 2 monthMobilization was started on the third postoperative daydepending upon the pain tolerance. Hip strengtheningexercise was initiated 6 weeks after surgery. All thepatients were kept nonweight bearing for initial 6 weeks. After which the patient was mobilized using crutches, with toe touch weight bearing. The weight bearing was increased gradually as tolerated by the patient, allowing full weight bearing after 12 weeks of surgery. All the patients were followed for 6 weeks, 3 months, and 6 months of surgery, and every 6 months thereafter..Partial weight bearing started with the use of walker for another six weeks. Serial radiographs showed progressive healing. Full-weight bearing was started about a 7 month post operatively when the right hip radiograph showed fracture consolidation with incorporation of the fibular strut graft. Twenty-two months postoperatively, the screws were removed. Patient was seen in the outpatient department 2 years postoperatively and the Harris hip score was ninety-four.

Fig. 1:- pre operative xray showing # neck of femur (right).

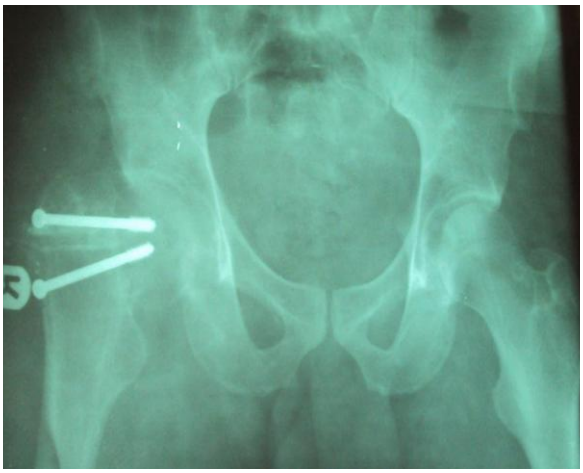

Fig. 2:- Ap view showing fibula graft between two ccs post fixation of neglected # neck of femur

Fig 3:- ap view after removal of screws.

Fig. 4:- frog leg lateral view of pelvis after removal of screws.

Discussion:-

There is no proper definition for fracture neck of femur to be called neglected, Meyer's et al.[10] have considered a criteria of 1-month whereas most other workers including Nagiet al.[11] and Sandhuet al.,[14] have considered a criteria of 3 weeks, beyond which the fracture was considered neglected. The patient whose case was presented had neglected his femoral neck fracture for two months. He then presented with an ununited femoral neck fracture and radiographic features that suggested aseptic necrosis of the ipsilateral femoral head. He was placed on a seven-day skeletal traction in order to offset the effects of contracture of hip abductors, overlap of fracture fragments and limb shortening

(1). The anterolateral approach was chosen because it avoided the posterior retinacular vessels and thereby limited the damage to the blood supply to the femoral head
(2). Bone graft was used to assist union and treat aseptic necrosis. It had been shown with ample evidence including experiments in dogs that cortical grafts provided structural support to the necrotic femoral head preventing its collapse and, with time, provided scaffold for revascularisation and osteogenesis along the length of the graft to the subchondral bone [4,12]. By this means, union was achieved and the aseptic necrosis was treated. This had been demonstrated in recent studies . The triangular shape of the fibular strut used in this case report strengthened the immobilization of the fracture by providing rotational stability at the fracture site [7,14]. Additionally two cancellous screws were used to obtain compression and more stability at the fracture site . It had been stated that the

two-screw-and-fibular-strut-graft construct was sufficiently stable forone not to use hip spica [14]. The total period of restricted weight bearing was the time it took for union to be evident - three months. The emphasis on restricted weight bearing until obvious evidence of union has been shown to give better results [14]. In this case report, a fibular strut graft and internal fixation with two screws were chosen for the treatment of a neglected femoral neck fracture in a young adult with radiological features of aseptic necrosis of the femoral head. Fibula being cortical bone provides mechanical strength besides stimulating the union and getting incorporated. The trifin shape of the fibula stabilizesthe fracture and prevents rotation. Hence is rightly described as a biological Smith-Petersen nail.[5] Union was achieved albeit with coxavarus. As per the meta-analysis of Roshan and Ram,[13] the results of nonvascular fibular grafting in neglected fracture neck by different authors have given nonunion rates between 0-17% and AVN rates of 0-33%. The functional outcome is difficult to compare as different studies have used the different criteria for evaluating the functional status of the patient. The 28 patients in the case series of Roshan and Ram[13] treated bythis method had an average HHS of 87.1 at a mean follow-up of over 6 years At two -year follow-up, there were no features of aseptic necrosis of the femoral head and his Harris hip score was 94%. The patient was told of the possibility of future osteoarthritis of the index hip and the need for regular follow-up. In conclusion, the use of non-vascularised fibular strut grafts and screws for fixation of non-united fractures of femoral necks, even in the presence of avascular necrosis, could lead to union. Fixation with cancellous screws and fibular strut grafts for neglected femoral neck fractures is costeffective and technically less demanding and associated with good outcomes. The femoral head is preserved; this can be converted to bipolar or total hip replacement if needed in future.

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