

SHORT TERM RESULTS OF MUSCLE PEDICLE BONE GRAFT (MPBG) IN FRACTURE NECK FEMUR: A CASE SERIES OF 7 CASES

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ABSTRACT

INTRODUCTION

Neglected, untreated and delayed neck femur fractures are commonly encountered fractures and the treatment dilemma arises specially when the patient is physiologically young and osteosynthesis is the preferred option. Past literature creates confusion as the various head salvage surgeries like valgus subtrochanteric osteotomy, non-vascularised fibular bone grafting, muscle pedicle bone grafting (Tensor fascia lata (TFL) and Quadratus femoris graft) and vascularised bone grafting do not have clear lines of indications.

We present a series of fracture neck femur cases, each with delayed presentation beyond the vascular emergency period, which were treated with osteosynthesis with MPBG using tensor fascia lata muscle pedicle graft.

KEYWORDS

Muscle pedicle bone grafting, Fracture neck femur.

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INTRODUCTION : Fracture neck femurs presenting after a month of injury is considered as neglected.¹ Many patients due to lack of awareness or lack of medical facility nearby frequently get neglected and end up in non-union fracture neck femur. Even patients presenting in less than a month but beyond the golden period, the treatment is controversial.

Squatting and sitting cross legged is inherently involved in the activities of daily living specially in a developing country like India. Considering the need of such patients and additionally the cost factor of joint replacements, the option of salvaging the femoral head is of paramount importance and many patients opt for head salvage surgery.

Literature has not clearly defined the guidelines for the choices between the various techniques of bone grafts used for neglected fracture neck femurs. Multiple options are available including valgus sub trochanteric osteotomy, non-vascularised fibular bone grafting, muscle pedicle bone grafting viz, Tensor fascia lata, Quadratus femoris graft and vascularized bone grafting.

Intracapsular neck femur fractures are considered by many authors as emergency surgery to be done with the golden period of 6 hours thereby making it a vascular emergency.²

Case Series: 7 cases series operated within a month of intra-capsular neck femur fractures, with TFL muscle pedicle BG used in each. Duration post injury was of 4 weeks in 3

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cases and 2 weeks in 4 cases. Average age was 47 years (range 38 to 55) with all seven males. Out of 7 cases 5 had trans cervical and 2 had sub capital fractures.

TECHNIQUE: Open reduction and internal fixation with 6.5 mm cannulated cancellous screws and was augmented with tensor fascia lata muscle pedicle graft which was fixed across the fracture site by 4 mm screws.

In supine position, Smith Peterson approach was taken and the fracture site was approached after giving a T-shaped incision over the capsule. Freshening of the fracture site bone edges was done. Fracture was reduced and through another lateral incision over the greater trochanter. Two 6.5 mm cannulated cancellous screws were put to fix the fracture. The tensor fascia lata origin from iliac crest was identified and using saw the graft was removed. The graft was fixed across the fracture site using 4 mm screws and in 5 cases a small 5 mm to 10 mm part of anterior femoral head was chiselled to adapt the graft across the neck properly. Adequate coverage of the neck by the capsule was ensured. Wound was closed over drain.



Picture 1: Anterior smith Peterson approach

Patient was mobilised non weight bearing with a walker for 3 months. Regular x-rays were taken at 6 weeks 3 months, 6 months, 1 yr. and 3 yrs. and patient was regularly followed up. Almost at the end of 6 months, 6 patients were being pain free and on plain radiographs fracture union was noted. One patient developed collapse and persistent non-union and thereafter the choice of THR was offered as the only feasible treatment.

Average of Modified Harris Hip Score (MHHS) at 6 wks. 34.1, at 3 months 55, at 1 yr. 93.5, at 3 yrs. 95 respectively of the seven cases. Follow up was at 6 weeks, 3 months, 1 yr. and 3 yrs. On an average it took 6 months before good radiological union is evident.

Case Photos:



Picture 2: Preoperative X-rays of patient showing a Garden type 3 and Pauwels type 3 fracture neck femur



Picture 3: Post-operative X-rays of the same patient treated with osteosynthesis using 2 cancellous cannulated screws and TFL MPBG



Picture 4: Follow up X-rays of the patient in picture 2, 3 at 1 year showing union in progress



Picture 5: follow X-rays at 3 years showing good bony consolidation after 3 years in a asymptomatic patient



Picture 6: X-ray of a patient with complication of persistent non-union with collapse

DISCUSSION: Femoral head viability is always of concern in fracture of femoral neck.³ Complications does include persistent non-union, AVN, collapse and arthritis.³ We had one collapse making the overall percentage of complication as 14 percent after 3 years. Those 6 cases which united went ahead to live a pain free life without restriction of any ADL even up-to 3 yrs. of follow-up. Vascularised bone grafting on a muscle pedicle such as gluteus medius, quadrates femoris, or Sartorius is also an established method of treatment quoted in literature.^{4,5,6} The advantages of TFL MPBG⁷ over others is as follows.

- a) Supine position facilitating anaesthesia and C-arm.
- b) Blood supply to the femoral neck is not compromised as the posterior capsule is left intact.
- c) Trochanter is not weakened unlike quadrates femoris MPBG.

To achieve best results essential requirements are an anatomically accurate reduction, impaction and stable fixation. While transferring the MPBG to its recipient site, any torsion or tension on the muscle pedicle should be avoided.⁶ Our series has a shortcoming of having only seven cases. The various studies have shown the results to be excellent as tabulated below.

Study	Number of cases	MPBG used	Complication Avascular necrosis(AVN) Non-union (NU)	Union rate
Meyers et al ¹	136	Quadratus femoris	AVN- 5 NU -15	89%
Bakshi et al ⁴	56	Quadratus femoris	AVN – 2 NU- 5	82%
Vallamshetla et al ⁸	42	Quadratic femoris	AVN-1 NU	86%
Day et al ⁹	15	Tensor fascia lata	Nil	100%
Hou et al ¹⁰	5	Tensor fascia lata	Nil	100%
Biswas et al ⁷	12	Tensor fascia Lata/ gluteus medius	NU -1	92%
Present case series	7	Tensor fascia lata	AVN – nil NU - 1	86%

Table 1: MPBG in the various studies

This case series although with only seven cases to start with, in a short term follow up shows excellent results of 86% with favourable outcome, comparable to the past literature on MPBG.

CONCLUSION: Younger group less than 50 yrs. presenting with neglected fracture neck femur should always be given an option of head salvage surgery in selected cases. MPBG has been proven although inconsistently as a valid option for fracture neck femur. We encourage osteosynthesis with the use of tensor fascia lata muscle pedicle grafting along with cancellous cannulated screws as a first option in selected cases of neglected femur neck fractures.

REFERENCES:

- Meyers MH, Harvey JP, Moore TM. Treatment of displaced subcapital and transcervical fractures of the femoral neck by muscle-pedicle-bone graft and internal fixation. A preliminary report on one hundred and fifty cases. *J Bone Joint Surg Am* 1973;55(2):257-274.
- Swiontkowski MF, Winquist RA, Hansen ST. Fractures of the femoral neck in patients between the ages of twelve and forty-nine years. *J Bone Joint Surg Am* 1984;66(6):837-846.
- Dedrick DK, Mackenzie JR, Burney RE. Complications of femoral neck fracture in young adults. *J Trauma* 1986;26:932-7.
- Bakshi DP. Internal fixation of ununited femoral neck fractures combined with musclepedicle bone grafting. *J Bone Joint Surg Br* 1986;68(2):239-45.
- Beris AE, Payatakes AH, Kostopoulos VK, et al. Nonunion of femoral neck fractures with osteonecrosis of the femoral head: treatment with combined free vascularised fibular grafting and subtrochanteric valgus osteotomy. *OrthopClin North Am* 2004;35(3):335-43.
- De SD, Balasubramaniam P. Anterior trochanteric muscle pedicle grafting. *J Bone Joint Surg Br* 1991;73(1):171-2.
- Col. Samar Kumar Biswas, Kuldip Raj Salgotra, Maj Pranab Kumar Lahree. Tensor fascia lata/ gluteus medius muscle pedicle bone graft for nonunion of femoral neck fractures. *MJAFI* 1997;53(1):19-23.
- Vallamshetla VR, Sayana MK, Vutukuru R. Management of ununited intracapsular femoral neck fractures by using quadratus femoris muscle pedicle bone grafting in young patients. *Acta Orthop Traumatol Turc* 2010;44(4):257–61.
- Day B, Shim SS, Leung G. The iliopsoas muscle pedicle bone graft: an experimental study of femoral head vascularity after subcapital fractures and hip dislocations. *Clin Orthop Relat Res* 1984;191:262–8.
- Hou SM, Hang YS, Liu TK. Ununited femoral neck fractures by open reduction and vascularized iliac bone graft. *Clin Orthop Relat Res* 1993;294:176–80.