

Evaluation of the Result of Dynamic Hip Screw Along with Postoperative Vitamin D Supplementation in Stable Trochanteric Fracture in Elderly Female

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ABSTRACT

Background: Recently trochanteric fracture is one of the common cause of morbidity in the geriatric group. Its mainly affect the elderly group who risk the loss of independence. Frequency of trochanter fracture is increasing with population aging. Treatment is usually surgical of various sorts. ORIF by DHS, PFN, DCS, Arthroplasty all coming in the way. Choice of implant need to focusing on the technical details. Among them DHS is one of the oldest and common devices that used in trochanter fracture. To evaluate the effectiveness of DHS along with Vitamin D in stable trochanter fracture in geriatric group female.

Materials and methods: This study was done for the period January 2019 to December 2020 among 36 elderly post menopausal lady with stable trochanter fracture admitted in different private hospital in Chittagong. Case selection was done after proper screening criteria. All patient were treated by ORIF by DHS under c-arm after preoperative evaluation. Post operatively all were treated with oral vitamin D supplement to enhance the union with implant. All the patient were followed up monthly both clinically and radiologically. Both the functional and clinical outcome was evaluate after 6 month of operation.

Results : Total 36 elderly female with stable trochanteric fracture with the age range (52-95years) were taken for the study. Open reduction and internal fixation done under c-arm by DHS and oral vitamin D given to all. Final assessment done after 24 weeks, out of 36 patient 50% patient had no limping, 11% regained previous walking ability, 8.3% unable to bear weight. Radiological improvement in healing showed in 91.7% case. Final outcome reveals excellent and good result in total 75% case which is very satisfactory surgical result. Where as only 3 case had a poor outcome those who not able to bear weight even after 24 weeks of operation.

Conclusion: The treatment of trochanter fracture by DHS simplifies nursing care, allows early mobilization and reduces mortality and morbidity specially in geriatric group. Stable fixation along with post operative vitamin D supplementation enhance the healing.

Key words: DCS : Dynamic Compression Screw; DHS : Dynamic Hip Screw; ORIF : Open Reduction Internal Fixation; PFN : Proximal Femoral Nail.

Introduction

Hip fracture is one of the major cause of hospital admission. Increasing each year and accounts for 30% of all hospital admission.¹ The incidence of unstable trochanteric fracture increase with age.² Most of the trochanter fracture occurs in patient from 66-76 years of age. It is three time more common in women than in men due to their wider pelvis, they tend to be less active

and osteoporosis earlier and they tend to live longer than men.¹ As osteoporosis, this fracture usually happen with minimum trauma. Due to elderly age thromboembolism, decubitus ulcer, knee stiffness, mental deterioration etc are frequent. 75% of trochanteric fracture are unstable.³ Usually trochanter fracture occurs through the highly vascular cancellous bone and usually heals within 8-12 weeks regardless of the method of treatment, almost of all case. However malunion and varus angulation may happened. The demand of the patient nursing stuff and the length of hospital stay render conservative method of treatment unacceptable today.⁴

For operative fixation different fixation device such as smith Peterson triflanged nail, jewett fixed angle nail plate, gama interlocking nail were used. Now a days Proximal femoral nail, dynamic hip screw or proximal femoral locking plate gaining popularity. PFN is now taking over now to DHS but it's a costly device and need more expertise, fluoroscopy exposure.

This DHS sliding device first described by Pohl and later by Pugh and Massie in the early 1950 gained

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popularity in the 1970 in its various modified form. It allows controlled collapse of major fragments but maintain the neck shaft angle even in unstable fracture.³ Early mobilization and weight bearing and do not hamper the stability of fixation rather impact the fragments. Reported success rate also high even in unstable fracture about 96%.⁵

Various aspects sliding device have been studied since its introduction. Almost all of them reported their experience of early fixation (with in 18-72 hours) and the population of different age groups. None of them reported the result of fixation of trochanteric fracture by dynamic hip screw and oral vitamin D support postoperatively only in elderly female above 50 years. So it is still more rational to study the advantage and disadvantage of the device in this context too.

Materials and methods

During the period of January 2019 to December 2020 total 36 elderly female with stable trochanter fracture was endorsed for the study preoperative vitamin D level was checked. All the unstable fracture, pathological fracture significant co morbidity was excluded. Informed written consent was taken from the patient and guardians before procedure. Proper preoperative evaluation done and per operative precaution taken. Operation done on fracture table and under fluoroscopic guidance. After operation 3rd pod dressing and drain off done, patient were discharge with oral vitamin D and advice for follow up. All the patient were followed up clinically and radiologically at 2 weeks, 6 weeks, 12 weeks, 24 weeks following surgery. All the patient were allowed to bear weight gradually after 6 weeks provided radiological position and healing. Parameter for evaluation were pain, limping, walking ability and living situation, patient satisfaction and radiological healing. Among radiological point of view alignment and healing was checked and position of leg screw and neck shaft angle. Post operatively vitamin D level rechecked at 24 weeks. The result in relation to functional ability were analyzed using the criteria followed by Kyle et al.⁵ The result of the operation rated into four categories: excellent– no limping, no pain, rarely need a cane while walking, good-noticeable limp, mild pain, a cane need in walking, fairlimp, moderate pain, two cane need while walking, poor-pain on any motion, wheel chair bound. Excellent and good results are counted as satisfactory outcome.

Results

Total 36 elderly female with stable trochanter fracture were enrolled for the series with the age range 52-95 years. Maximum 44.4% were house wife with right

side predominance 69.4%. All patient were operated after proper preoperative evaluation under fluoroscopy assist. Mean hospital stay was 8.7 days. Postoperatively patient was on oral vitamin D coverage and followed up accordingly. Final assessment done after 24 weeks, out of 36 patient, 50% patient had no limping, 11% regained previous walking ability, 8.3% unable to bear weight.

Radiological improvement in healing showed in 91.7% case. Postoperative complication SSI was 2case (5.5%), deep infection was 3(8.3%), UTI(2.7%), pneumonia (2.7%), lag screw cutout (5.5%). Luckily none of them need a second surgery. Final outcome reveals excellent and good result in total 75% case which is very satisfactory surgical result. Where as only 3 case had a poor outcome those who not able to bear weight even after 24 weeks of operation.

Table I Demographic differentials

Age	Range	Mean age	
	52-95 years	75.05±12.62	
Side	Right	Left	
	25(69.4%)	11(30.6%)	
Occupation	House wife	Retired	Service holder
	16(44.4%)	15(41.7%)	5(13.9%)
Co morbidity	HTN	DM	Cardiac
	5(13.9%)	3(8.3%)	3(8.3%)

Table II Clinical findings

Walking ability	6 Weeks	12 Weeks	24 Weeks
Limping	3(8.3%)	13(36.1%)	18(50%)
Weight bearing not possible	23(63.9%)	5(13.9%)	3(8.3%)
Almost non ambulatory	3(8.3%)	0	0
Satisfactory			
Radiological healing	25(69.4%)	32(88.9%)	33(91.7%)
Vitamin D level mean	Preoperative group 21.4 ng/ml	Post operative group 30.3 ng/ml	

Table III Final outcome after 24 weeks follow up

Functional outcome	Rate
Excellent	11 (30.6%)
Good	16 (44.4%)
Fair	6 (16.7%)
Poor	3 (8.3%)
Satisfactory (Excellent+ Good)	27(75%)
Unsatisfactory (Fair + poor)	9 (25%)

*p value is 0.005 which is significant in the satisfactory group.



Figure 1 Pre operative X-ray



Figure 4 X-ray after 1 year

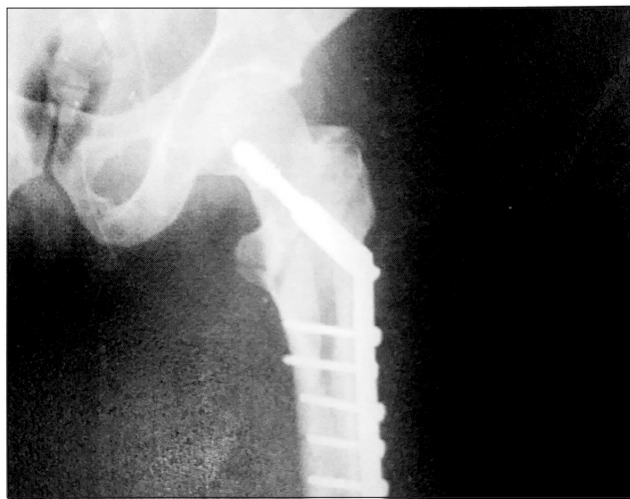


Figure 2 Post operative X-ray



Figure 3 X-ray after 28 weeks

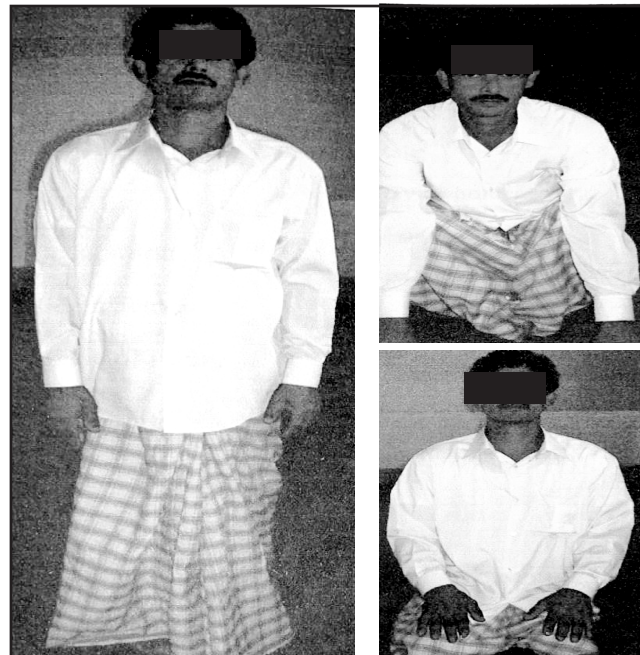


Figure 5 Final follow up

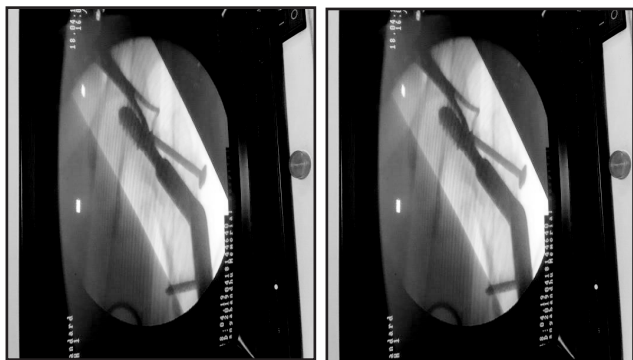


Figure 6 24 weeks followup

Discussion

This series include 36 females aged over 50 years with trochanter fracture treated by surgery in the form of DHS with oral vitamin D supplement and found 75% success rate, no other study done with such specificity before but Heyse-Moore et al. done study with 107 case and found 92.6% success both are statistically significant.⁶ Probably for osteoporotic female healing rate is a bit low than general people which explained the low success rate.

In this series mean age is 75 years which is comparable to other series, Kyle et al, Larsson et al.^{5,7} Thirty one patient (86.1%) are sedentary worker housewife or retired where only 13.9% are active person in the study. It is interesting to note that 25(69.4%) case involved the right side Whitelaw et al also reported that right side affected more than left side.⁸

Due to illiteracy, superstition, poor socioeconomic status and bad communication system operation were performed in the series average 15 days after injury where as other series Larsson et al average operation done with in 37.32 hours after surgery.⁶ Larsson et al. showed 9-10% associated injury along with trochanter fracture but exclude any other associated injury in the series.⁷ Most author showed early weight bearing within 3-5 days of surgery where depending on the stability of female osteoporotic bone average time for partial weight bearing with crutch support in the series was 24 days.

Heyse moore et al showed 100% success rate with DHS in stable fracture where as we showed 75% of success rate as we specify in target population to geriatric and female osteoporotic bone which may influence the outcome.⁶

In this series only 2(5.5%) case of lag screw cutout of femoral head along with varus angulation it consider as mechanical failure where satisfactory radiological healing showed 91.7% case, Heyse-moore et al. shows 9.3% of radiological failure in there series.⁶ The cause of unsatisfactory healing were advance age, osteoporotic bone, failure in follow up, negligence of attendants and early weight bearing to some extent. Infection rate to the series a bit high 13.8% where kyle et al. showed only 2.1% of infection.⁵

Ahmadreza et al showed fracture union was higher at the clinical examination in the group receiving the supplement with low vitamin D which is similar to the study.⁹

Conclusion

Geriatric population in our country mostly depended on their family. As the trochanter fracture occurs in elderly group, they become a burden for the family and the society as well. If they remain immobilized for long time, they mostly like to develop life threatening complication ,great economical loss and mental breakdown. Early fracture fixation device like DHS may help this group in every expect improved the standard of living.

Recommendation

Moreover vitamin D deficiency is a global problem now a days. Meticulous surgery with proper fixation device along with vitamin D supplementation may enhance the fracture healing to a great extant. This study can be followed up later on to get long term results and adding more case to determine more accurate result can also enlarge the series.

Disclosure

All the authors declared no competing interest.

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