INCIDENCE OF IATROGENIC CALCAR FRACTURES IN HIP HEMIARTHOPLASTY.

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ABSTRACT:

Objective: To identify the incidence of iatrogenic fractures in hip hemiarthroplasty and identifying technical errors and how to deal with the complication. **Materials and Methods:** This is prospective cohort study in which we analyzed patients who had hemiarthroplasty with un cemented Austin moore& cemented bipolar endoprosthesis conducted at Liaquat National Hospital Karachi Sindh with particular reference to intra operative errors associated with iatrogenic calcar fracture and change in the plan of management with stable fixation. Data was analysed using SPSS version 21. **Results:** Total 175 were proceeded with hemiarthroplasty of hip out of which 9(5.1%) patients had intra-operative calcar fracture 6 AMP(3.4%) + 3 Bipolar HA(1.7%).Different intra-operative errors were noted during the surgeries.Inadequate soft tissue clearance in 27 (15.4%), incorrect cutting neck length in 19 (10.8%) cases, Incorrect head size 11 (6.2%). inadequate calcar seating in 3(1.7%). Improper cementing technique in 2 (1.1%) cases. 4(2.2%)Intraoperative calcar fractures in AMP were converted to cemented bipolar HA and cerclage wire was applied and 2(1.1%) AMP were proceeded with cerclage wire and considered stable.Out of 175 hemiarthoplasties 30(17.14%) patients stated no pain 85(48.57%) stated mild pain and 40(22.85%) stated moderate pain and 20 (11.42%) complained of severe pain.Radiological assessment stratified 2 patients had subsidence of the stem> 3 mm, 5 patients had signs of loosening of implant confirmed by bone scan and MRI, 3 patientsacetabular protrusion and/or erosions, no one had heterotopic ossification 4 had dislocations. **Conclusion:** Hip surgeries always have been demanding specially hemiarthroplasties which needs expertise in particular field to avoid intraoperative complications and avoiding a technical error which causes change in the plan of management.

Key words: Iatrogenic, Calcar Fractures, Hip Hemiarthoplasty

How to cite this article: Jumani NA[1], Abro AA[2], PerachaA[3], Idress Z[4], Siyal S[5], Shankar J[6], Aftab N[7]. **. INCIDENCE OF IATROGENIC CALCAR FRACTURES IN HIP HEMIARTHOPLASTY.** JPUMHS;2020;10:04,96-99.
DOI: http://doi.org/10.46536/jpumhs/2020/10.02.266

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INTRODUCTION:

Hip fractures are common entity in elderly population usually caused by fall and most common reason of hospital admission. By the year 2050,there will be an estimated 3.9 million hip fractures worldwide and 700,000 in the United States.[1] Femoral neck fracture is one of the hip fractures requiring technical expertise.the treatment of choice in elderly population with displaced femur neck fracture is hemiarthroplasty. In recent years unipolar hemiarthroplasty with Austin moore prosthesis is rarely done in developed countries but it is still commonly used in developing conutries in in limited or non ambulatory, low Demand patients or with shorter life expectancy who can not afford 2nd surgery. Recent literature suggest increase rate of complications with uncementedhemiarthroplasty as compared to cemented bipolar hemiarthroplasty, Accordingly, the NICE guidelines (2011) recommend that arthroplasties for hip fracture should be cemented [2]. Iatrogenic fractures of calcar occurs during the insertion of implant or during the reduction are mostly caused by mechanical stresses arising during the procedure. Mechanical stress may be due to inadequate soft tissue clearance, incorrect cutting neck length, inadequate calcar seating. Incorrect head size. Improper cementing technique and it may be favored by local variations like bone quality preexisting alteration in proximal femur anatomy

The purpose of this study is to identify the incidence of iatrogenic fractures in hip hemiarthroplasty and identifying technical errors and how to deal with the complication.

MATERIAL AND METHODS: This is prospective cohort study in which we analyzed patients who had hemiarthroplasty with un

cemented Austin moore& cemented bipolar endoprosthesis conducted at Liaquat National Hospital Karachi Sindh with particular reference to intra operative errors associated with iatrogenic calcar fracture and change in the plan of management with stable fixation.Study was conducted from jan 2014 to dec 2016.the choice of prosthesis used in patients were based on according to patients age patients medical condition and life expectancy, such as AMP was used in elderly patients, non ambulatory, low Demand patients or with shorter life expectancy and cemented bipolar hemiarthroplasty used in comparatively younger patients with good ambulatory status and expected long life ahead. Approach used in all surgeries was lateral Harding's approach of the hip. Surgeries were operated by 3 different surgeons with same expert level. Patients medical record was reviewed and data collected which included Age, Sex, Date of Admission, Date of Surgery, Date of discharge, Total hospital stay, Surgical Approach used,Intraoprative complications, ASA grade [3] The inclusion criteria was adult patients of both gender Male and female age from 50 to 100 mean age 75 years who had Neck of femur fracture.Patients with multiple fractures, head trauma, pathological fracture, advanced osteoarthritis or ankylosed hip joint were excluded from the study.

Patients were followed in out patient department stitches removed at 2 weeks radiological and clinical assessment on the basis of fracture healing and ambulation were assessed on 6th week 3 months and 6 month and 1 year.Mobility was assessed with regard to ambulation without assistance, with assistance of either a cane or walker or inability to walk. In relation to radiographic analysis the next were evaluated: subsidence of the stem, signs of loosening, acetabular protrusion and/or erosions, heterotopic ossification and dislocations [4].Data was analysed using SPSS version 21.

RESULTS:

In our study we included bothaustenmoore prosthesis & cemented bipolar Hemi arthroplasty. Total number of patients included in our study were 190 in which 110 were male and 80 were females. In 80 males Bipolarhemiarthroplasty was planned and in 30 males AMP was planned. In 65 females cemented Bipolar HA was performed and and 15 planned for AMP. Out of 190 patients 15 cases were excluded 12 cases lost to follow up and 3 patients died. According to American society of Anesthesiology (ASA) classification 36 cases were classified as grade II, 74 cases as grade III, and 65 cases as grade IV. Mean age of patients was 75years (50-100). Ambulatory status of the patient was 95 patients were community ambulant without any support before history of the fracture, 75 patients were community ambulant with the help of cane or walker, and 5 were unable to walk Mean hospital stay was 8 days (4-16 days),mean delay between the admission and operation was 2-3 days (1-8 days).Total 175 were proceeded with hemiarthroplasty of hip out of which 9(5.1%) patients had intra-operative calcar fracture 6 AMP(3.4%)+3 Bipolar HA(1.7%).

Different intra-operative errors were noted during the surgeries.Inadequate soft tissue clearance caused difficulty in reduction and increased stress on calcar noted in 27 (15.4%), incorrect cutting neck length noted in 19 (10.8%) cases, Incorrect head size 11 (6.2%). inadequate calcar seating in 3(1.7%). Improper cementing technique in 2 (1.1%) cases. 4(2.2%) Intraoperative calcar fractures in AMP were converted to cemented bipolar HA and cerclage wire was applied and 2(1.1%) AMP were preceded with cerclage wire and considered stable. Patients were followed up in OPD pain and ambulatory status was checked. Out of 175 hemiarthoplasties 30(17.14%) patients stated no pain 85(48.57%) stated mild pain and 40(22.85%) stated moderate pain and 20 (11.42%) complained of severe pain. Pain was assessed using visual Analogue score system. At the final follow up 109 patients were community ambulant 60 patients needed assistance and 6 patients were unable to stand (due to other medical problems).

In respect to radiological assessment2(1.14%) patients had subsidence of the stem> 3 mm, 5(2.85%) patients had signs of loosening of implant confirmed by bone scan and mri,3(1.17%) patientshad acetabular protrusion and/or erosions, none(0%) had heterotopic ossification, 4(2.28%) had dislocations.

Discussion: Hemiarthroplasty of hip is very demanding procedure it needs expertise with fine skills and better decision power. In our study we covered different aspects of hip hemiarthroplasty.

We reviewed iatrogenic calcar fractures, technical errors leading to iatrogenic fracture, management of the fracture and post operative ambulatory status and pain persistence. In our study we found 5.1% iatrogenic calcar fracture, 3.4 in Austen moore prosthesis and 1.7% in bipolar hemiarthoplay.

Fernández-Valencia in his study Intraoperative periprosthetic femoral fractures related to Austin Moore hemiarthroplasty-A retrospective review of 365 patients stated over all 6.8% intraoperative periprosthetic fracture[5]. Singh GK in his study Uncemented Austin–Moore and cemented Thompson unipolar hemiarthroplasty for displaced fracture neck of femur-Comparison of complications and patient satisfaction found 0% incidence of intraoperative periprosthetic fracture in cemented Thompson group and 3.4% of intraoperative periprosthetic fractures in AMP group[6].Weinrauch in his study Intraoperative error during Austin Moore hemiarthroplasty found 14 % iatrogenic fractures in consecutive 147 patients who had AMP surgery[7].

Weinrauch PC in his study early prosthetic complications after unipolar hemiarthroplasty stated that 11.8 % AMP and 1.8% cemented Thompson had intraoperative periprosthetic fracture[8].

In this study we reviewed different technical errors which caused iatrogenic calcarfracuture we found that inadequate soft tissue clearance was the most common error 27 (15.4%) which caused increase in stress over calcar and while reducing the head calcar fractured.Pryor GA in his study“A study of the influence of technical adequacy on the clinical result of Moore hemiarthroplasty” reported significant technical errors in hemiarthroplasty.[9]

Incorrect resection of neck length wasthe second most common error noted in 19 (10.8%) cases which caused improper implant sitting and required more force in reduction and ended up in iatrogenic calcar fracture. Shekhar A and Murgod G in their study. Two years outcome of cemented Austin Moore Hemiarthroplasty for Fracture neck Femurreported inadequate neck length remnant as the commonest intraoperative implantation error[10].

Incorrect head size was a technical error found in 11 (6.2%). Inadequate head size may be one of the reason for calcar fracture mostly large head size which cause difficult reduction. In bipolar HA small head size results in recurrent dislocations.DD Mue and WT Yongu in there study “Intra-Operative Implantation Errors During Hemiarthroplasty” reported Incorrect prosthetic head size in 2(5.7%) patients[11].

Inadequate calcar seating was noted in 3(1.7%).Yau et al in his studyCritical radiological analysis after Austin Moore hemiarthroplasty stated that inadequate metaphyseal fill may also predispose to excessive subsidence of prosthesis, loosening and pain[12] in an other study by DD MUE et al Inadequate proximal metaphyseal fill was observed in 1(2.9%) patient.

In our study pain and ambulatory status was checked on Follow ups. Out of 175 hemiarthoplasties 30(17.14%) patients stated no pain85(48.57%) stated mild pain and 40(22.85%) stated moderate pain and 20(11.42%) complained of severe pain, majority of patients who complained of severe pain had subsidence and loosening of implant.Sharif and Parker in a review of 243 Austin Moore prostheses found at 1 year post surgery 61 patients (25.1%) had residual pain and 17 patients (7%) required revision surgery for aseptic loosening[13].Davidson D in his study stated that Both residual pain and revision for aseptic loosening were strongly associated with features of the operative technique, namely caudal resection level of the femoral neck, inadequate seating of the prosthesis and inappropriate selection of prosthetic head size[14].

On the basis of radiological assessment 2(1.14%) patients had subsidence of the stem> 3 mm, 5(2.85%) patients had signs of loosening of implant confirmed by bone scan and MRI, 3(1.17%) patients had acetabular protrusion and/or erosions, none(0%) had heterotopic ossification, 4(2.28%) had dislocations.

Ambulation was advised on the basis of implant in cemented Hemiarthroplasty early ambulation was started and in AMP who had calcar fracture delayed ambulation was started average was 6 weeks time period.At the final follow up 109 patients were community ambulant 60 patients needed assistance and 6 patients were unable to stand (due to other medical problems).

CONCLUSION: Hip surgeries always have been demanding specially hemiarthroplasties which needs expertise in particular field to avoid intraoperative complications and avoiding technical errors which causes change in the plan of management and there should be proper training of young surgeon’s.there should be proper selection of implant to be used in hemiarthoplasty either cemented or uncemented.

ETHICS APPROVAL: The ERC gave ethical review approval

CONSENT TO PARTICIPATE: written and verbal consent was taken from subjects and next of kin

FUNDING: The work was not financially supported by any organization. The entire expense was taken by the authors

ACKNOWLEDGEMENTS: We would like to thank the all contributors and staff and other persons for providing useful information.

AUTHORS' CONTRIBUTIONS: All persons who meet authorship criteria are listed as authors, and all authors certify that they have participated in the work to take public responsibility of this manuscript. All authors read and approved the final manuscript.

CONFLICT OF INTEREST: No competing interest declared.

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