

Case Series

Study of the post operative outcome in orthopaedic management in cases of high HbA1c diabetic patients-a case series

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ABSTRACT

Elderly diabetic patients are at risk of poor fracture healing in post-traumatic fracture even due to trivial low energy falls and chronic pathological bone involvement. Glycated haemoglobins are haemoglobins with an attached sugar moiety. HbA1c is the predominant fraction of HbA1 and gives an estimate of the blood sugar levels of an individual over the last three months. Here we present a case series of 3 elderly patients who came to us with post traumatic fractures or chronic bone pathologies and very high HbA1c values (>10%) who required operative orthopaedics management. The injuries were adequately managed with splintage and operative procedures after proper control of the patients' blood sugars levels. Postoperatively mobilization was challenging. Orthopaedic chronic bone pathologies and post traumatic limb fractures with uncontrolled sugar and very high HbA1c are very difficult to treat. Postoperatively patients are at a very high risk of infection, poor suture healing, risk of repeat fracture, osteoporosis, etc which often results into functional outcome being hampered. Proper counselling by operating surgeon, physiotherapy and postoperative rehabilitation with the help of relatives and assisting devices with strict preoperative and post operative sugar control provides good outcome. In cases of trauma in old age, one should always thoroughly examine and screen for comorbidities such as hypertension and diabetes using reliable markers such as HbA1c levels. So that early appropriate treatment and mobilization can be done with good functional outcome.

Keywords: Diabetes mellitus, HbA1c, Orthopaedics, Operative management

INTRODUCTION

Elderly diabetic patients are at risk of fractures of limb fractures, spine and hip even due to trivial low energy falls and are also predisposed to chronic bone pathologies such as avascular necrosis of head of femur.¹

These pathologies have a significant economic impact and also increase public health burden.²

These fractures and pathologies cause high rates of complications, hampered function with reduced quality of life, morbidity and mortality.²

Chronic conditions like cardiovascular diseases, poor visual acuity, diabetes mellitus or neurologic disorders are dominant risk factors which lead to longer hospitalization, higher complication rates and mortality.³

Glycated haemoglobins are haemoglobins with an attached sugar moiety. They constitute the HbA1 fraction of the adult haemoglobin HbA. HbA1c is the predominant fraction of HbA1 and gives an estimate of the blood sugar levels of an individual over the last three months.¹

HbA1c levels are correlated with the development of diabetic complications and HbA1c assessment is now the

gold standard for evaluation of diabetes control. HbA1c level should not be higher than 7% to avoid these complications.⁵

Increased risk for ≥ 2 fractures was found in subjects in the highest tertile of HbA1c ($\geq 7.9\%$) compared with the lowest tertile ($\leq 7.17\%$).⁶

CASE SERIES

A 60 years old male patient, resident of local vicinity presented to our tertiary care center with complaints of pain around right shoulder after allegedly history of slip and fall one day back while walking. There didn't have any history of head/chest injury nor ENT bleed. Medical history revealed patient was a known case of diabetes since 10 yrs and was on oral medications for the same. Patient had history of poor compliance to his diabetic medication.

Patient was an Operated case of of right shaft of humerus plating fracture in 2010 in Dubai.

On admission a routine blood work up was done, his HbA1c was found to be 10.8 %.

Local examination of right shoulder gave following findings-Right upper limb shortened and in internal rotation with swelling and tenderness around the shoulder, and painful range of motion around shoulder joint.

Plain radio-graphs were done, and were suggestive of proximal humerus fracture of right humerus with no distal neurovascular deficit.

This patient was managed with PHILOS plating for proximal humerus fracture with strict preoperative and post operative sugar control and monitoring (Figure 1-3).

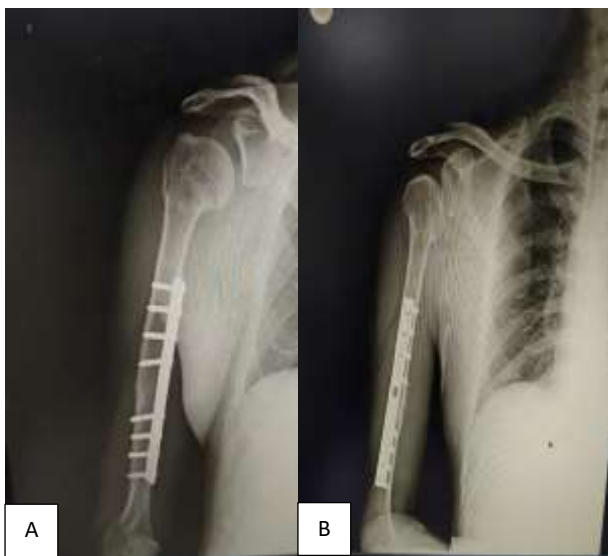


Figure 1 (A and B): Preoperative x-rays.

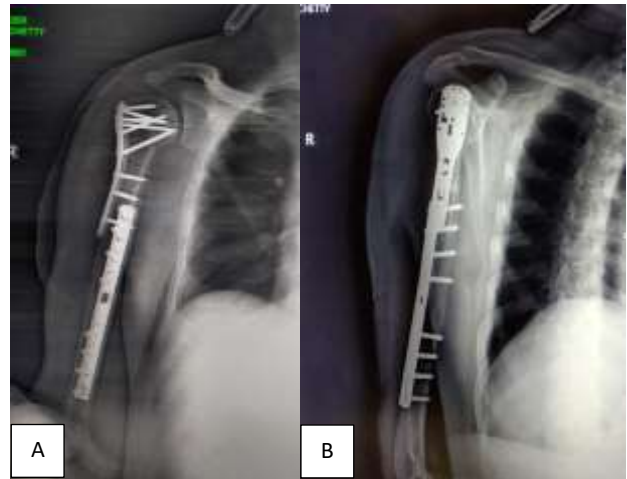


Figure 2 (A and B): Post-operative x-rays.



Figure 3: Post operative wound sutured with ethilon 2-0 sutures.

A 72 years old female patient, resident of local vicinity presented to our tertiary care center with complaints of pain around left hip after allegedly history of slip and fall six days back while walking. There didn't have any history of head/chest injury nor ENT bleed. Medical history revealed patient was a known case of DM for 10 years on tablet gliclazide plus metformin BD

Known case of hypertension since 10 years on tablet telmasartan 20 mg BD.

H/O IHD 10 Years back when she was started on tablet clopidogril and aspirin 75 mg BD and isosorbide mononitrate BD.

On admission a routine blood work up was done, his HbA1c was found to be 12.8%.

Local examination of left hip gave following findings-left lower limb shortened and in external rotation with tenderness around the lateral aspect of the hip, and painful range of motion around hip joint.

Plain radio-graphs were done, and were suggestive of intertrochanteric fracture of left femur with no distal neurovascular deficit.

This patient was managed with DHS plating for intertrochanteric fracture of left femur with strict preoperative and post operative sugar control and monitoring (Figure 4-6).



Figure 4 (A-C): preoperative x-rays.

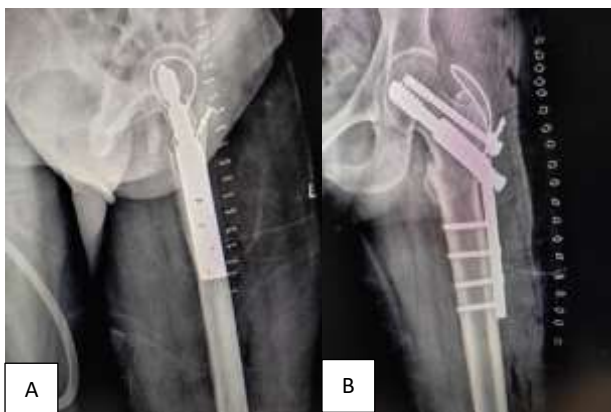


Figure 5 (A and B): Post operative x-rays.



Figure 6: Post operative suture site after suture removal on day 14.

A 70 years old male patient, resident of local vicinity presented to our tertiary care center with complaints dull aching pain over right hip which was dull aching and gradually progressive following an incident of electric shock 2 years back.

Patient has H/o DM and HTN medication (irregular and not known to him).

Patient has H/o alcohol abuse present stopped 3 years back.

No h/o recent trauma with No h/o steroid intake, No h/o hypo or hyperthyroidism.

On admission a routine blood work up was done, his HbA1c was found to be 12.6%.

Local examination of right hip gave following findings-Right lower limb shortened and tenderness around the anterior aspect of the hip, and painful range of motion around hip joint. Pain on internal rotation of hip and abduction of right hip was restricted.

Plain radio-graphs were done, and were suggestive of grade 4 avascular necrosis of head of right femur with no distal neurovascular deficit.

This patient was managed with total hip replacement of head of right femur with strict preoperative and post operative sugar control and monitoring (Figure 7-10).



Figure 7: Preoperative x-rays.



Figure 8: Post operative x-rays.



Figure 9: Post operative suture site wound dressing on post op day 14.

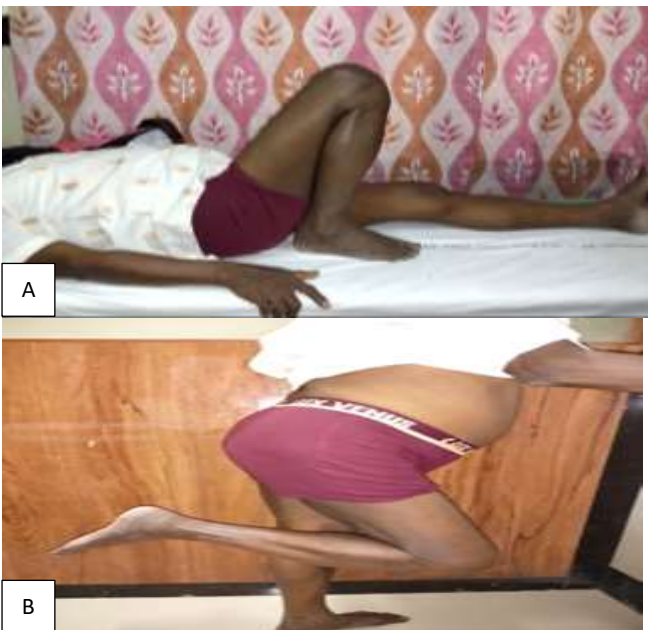


Figure 10 (A and B): Post operative mobilisation.

DISCUSSION

Type 1 diabetes is an autoimmune disease characterized by absolute insulin deficiency due to pancreatic beta-cell destruction and consequent hyperglycemia. Diabetes-related complications are the main cause of morbidity and mortality in subjects with type 1 DM and bone fragility is being recognized as a new complication of both type 1 and type 2 diabetes. The incidence of type 1 DM is increasing worldwide.^{2,3,6}

As bone fractures and pathologies are associated with increased morbidity and mortality, a better understanding of factors related to bone fragility in type 1 DM is crucial to identify risk factors to be tackled to decrease the incidence of fractures in this population. The goal of the present study was to investigate diabetes-related clinical factors which hamper the post operative complications related to the orthopedic cases which were managed operatively in case of diabetic patients with high HbA1c (>10%). To assess long-term glucose control, we considered the average of HbA1c measurements obtained by study subjects by means of preoperative blood workup.⁶

High HbA1c is an indicative of an association between poor glycemic control and increased bone pathologies/fracture risk. High HbA1c indicated towards the high uncontrolled sugar levels over the last 3 months which gives an idea as to the body's fluctuating sugar levels and also results into the patient being catered as a high-risk patient for management of orthopedic ailments. these factors need to be considered when planning the mode and line of management for fresh fractures and bone pathologies such as hip AVN.⁶

High risk of post operative complications in uncontrolled diabetic patients may result into the treating surgeon opting for a more conservative line of management in majority of orthopedics conditions.⁷

But with this study we realized that with early and methodical detection of uncontrolled blood sugar levels with means of standardized blood parameter such as HbA1c along with preoperative strict sophisticated glycemic control we can reduce the post operative complications such as delayed wound healing, suture site infections, implant infection, implant failure/ rejections, etc.^{6,8}

High mean HbA1c reflects the degree of hyperglycemia. This is in accordance with pre-clinical and clinical data showing that chronic hyperglycemia may impact osteoblast function and bone quality specifically in subjects with type 1 DM.⁹ Pre-operative planning and an medicine opinion for management of DM along with early supervised mobilisation with mental motivation can result into great post operative outcomes for patient operatives with high HbA1c in orthopedics.^{9,10}

CONCLUSION

Orthopaedic chronic bone pathologies and Post Traumatic limb fractures with uncontrolled sugar and very high HbA1c are very difficult to treat. Postoperatively patients are at a very high risk of infection, poor suture healing, risk of repeat fracture, osteoporosis, etc which often results into functional outcome being hampered. Proper counselling by operating surgeon, physiotherapy and postoperative rehabilitation with the help of relatives and assisting devices with strict preoperative and post operative sugar control provides good outcome. In cases of trauma in old age, one should always thoroughly examine and screen for comorbidities such as hypertension and diabetes using reliable markers such as HbA1c levels. So that early appropriate treatment and mobilization can be done with good functional outcome.

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