



MANAGEMENT OF MAXILLARY SINUS MEMBRANE PERFORATION AND SIMULTANEOUS IMPLANT PLACEMENT

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ABSTRACT **Introduction:** Schneiderian membrane perforation is the most common complication of maxillary sinus augmentation procedures and has been associated with a variety of postsurgical problems. Multiple techniques to repair perforated Schneiderian membranes have been reported in the dental literature.

Case Report: A 26 year old patient came for replacement of upper right maxillary molar. Due to inadequate residual bone height in that region, a maxillary sinus augmentation procedure was planned with direct sinus lift and simultaneous implant placement. During the elevation of maxillary sinus membrane perforation of sinus membrane occurred. Sinus membrane perforation was carefully assessed, classified and managed by direct repair. Sinus membrane was repaired by absorbable 5-0 sutures with placement of absorbable GTR membrane, bone substitute and simultaneous implant placement. After proper post operative instructions and seven month follow up no complications were reported and well osteointegrated implant with three mm of apical bone was seen.

Conclusions: The case report indicates if maxillary sinus membrane perforation is well managed then it has no effect on the outcome of implant survival.

KEYWORDS :

Introduction :

There is ample evidence in literature about the augmentation of maxillary sinus, which is done to increase the bone volume for placement of implants in maxillary edentulous posterior jaw [1]. The implant success of these augmentation procedures are comparable to success of implants in non augmentation cases. Most common complication during the maxillary sinus augmentation procedures is perforation/tear of Schneiderian membrane, this counts for 11-56% of all complications [2]. This either leads to rejection of the implant placement or decrease in bone formation or infection in maxillary sinus thus resulting in reduction in implant success [3,4]. Numerous techniques have been used in literature for repair of Schneiderian membrane perforation. These repair procedures have increased the survival prognosis of implants [5-7]. Most common of these procedures are direct repair of schneiderian membrane and indirect repair by placement of resorbable guided tissue regeneration(GTR) membrane have been successfully used in multiple studies of maxillary sinus perforation repairs [8-13].

Case Report

A 26 yr old girl patient came for replacement of missing maxillary right posterior teeth, which was extracted two years back due to caries. For replacement of 16 patient was evaluated for implant placement. Edentulous span was 9 mm with ridge width of 7mm. There was deficient residual ridge height of 6 mm from crest of ridge to maxillary sinus. After all radiographic and blood investigations patient was planned for direct sinus lift with simultaneous placement of 4.2 X 11 mm of implant.



Fig 1: 6mm of residual bone in right upper first maxillary molar region

Patient along with parents were explained the surgical procedure and complications associated with and written consent was taken. A full thickness mucoperiosteal flap was raised from distal aspect of 13 to 17, exposing 15 mm above the crest of the ridge[Fig 2].



Fig 2: Full thickness mucoperiosteal flap raised



Fig 3: Sinus membrane perforation mesial & distal to fractured lateral window wall

After raising a full thickness flap a lateral window was prepared by reduction handpiece of micromotor under copious irrigation, hand instruments were used to evaluate and elevate sinus membrane. While elevation of sinus membrane the lateral wall fractured into the maxillary antrum. This caused two tears in the maxillary sinus membrane[Fig 3].

The perforation was identified and classified according to Fugazzotto and Vlassis criteria of classification [6]. Mesial perforation was classified as Class II B and distal perforation to be Class II A. This perforation were also evaluated for final out comes in terms of implant survival according to Albrektsson success criteria [14]. Size of window was enlarged for repair of schneiderian membrane to get better access. It was planned to treated by direct repair of schneiderian membrane by placing 5-0 absorbable sutures as technique of Ali

Hassani et al [15] and placement of restorable collagen GTR membrane with alloplastic bone substitute (Nova bone putty).

Sinus membrane was carefully elevated without increasing the perforation, Implant osteotomy was done, Nova bone putty bone substitute was placed following which implant was placed. It was seen that sinus membrane was attached to fractured lateral wall segment, no attempts were made to separate sinus membrane from that segment and this was used to implement t and use for repair as per technique of Ali Hassani et al. First mesial perforation was managed Two bur holes were made thru bone, one in bone which was mesial to the tear and second in mesial aspect of the fractured segment. A 5-0 absorbable suture was passed thru these two bur holes and knot was placed over the bone in outer aspect of lateral wall.

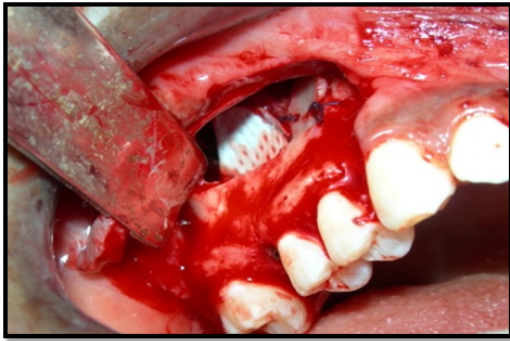


Fig 4: Repair of Sinus membrane perforation by absorbable sutures and GTR membrane



Fig 5: Repair of Sinus membrane perforation with simultaneous placement of bone substitute and Implant, primary closure was achieved.

In management of distal tear, a bur hole was made in distal aspect of fractured lateral window wall. A 5-0 absorbable suture was passed thru it and on other end carefully bite was taken in sinus membrane. The knot was given very carefully with light pressure with no jerky movements. Both repair sites were covered by GTR membrane. Bone substitute was placed over GTR membrane [Fig 4,5]. This bone substitute was covered by calcium sulphate barrier layer. Flap was closed, primary closure was achieved. Patient was prescribed amoxicillin + potassium clavulanate 1000 mg twice daily, tablet Tinidazole 500 mg twice daily with Tab combiflam thrice daily for five days. Along with this Oxymetazoline nasal drops thrice daily for five days. Patients were also asked not to blow nose forcefully for 14 days. Patient was reviewed after 24 hours, 3 days, 7 days, 10 days and 15 days. Sutures were removed after 10 days. Patient was evaluated for complications like swelling, hematoma, pus discharge, adjacent tooth complications, systemic complications, hemoptysis, cyst formation, sinus congestion and sinusitis.



Fig 6: Seven month radiographic and CBCT scan suggest well osteointegrated implant 3mm bone formation apical to implant.

Pt had minor swelling at 24 hrs with pain which subsided on third day. No other complication was reported and healing took place

asymptotically. Seven month radiographic and Cone beam CT scan suggest well osteointegrated implant 3mm bone formation apical to implant [Fig 6].

Discussion

Complications resulting from surgical sinus membrane repair have not been reported or investigated thoroughly even in large dental setups. This sinus membrane perforation mainly caused due to operators error along with other reasons like presence of a Septa/ Spines, thin membranes, sinus pathology, previous entrance into the sinus, sharp line angles, irregularities at sinus floor and membrane adhesion. In this case sinus membrane perforation occurred due to operators error this may be also because of learning curve in procedure of direct maxillary sinus lift in training institute.

An overall cumulative survival rate of 91.99% is reported in many studies after management of sinus membrane perforation. While there is some argument regarding the importance of the presence or absence of an intact Schneiderian membrane in the achievement of anticipated and satisfactory regeneration of hard tissues in an augmented maxillary sinus area, there is no two ways in the fact that an intact Schneiderian membrane afford substantial foundation enclosing the inserted graft materials and the subsequent formation of blood clot. However, the occurrence of a tear in the sinus membrane faced during sinus augmentation therapy should not be seen as a contraindication to either cancelling the planned augmentation with or without simultaneous implant placement, or to the achievement of satisfactory sinus augmentation results.

The most effective treatment of maxillary sinus membrane perforations is their prevention. Preoperative diagnosis and treatment planning are paramount in this regard, as is care in window preparation, utilizing precise and well tested techniques and instruments like peizo surgical unit, and an tissue friendly, structured, preeminent method of surgery are essential if such complications are to be minimized. Nevertheless, perforations do occur, which cannot be completely negated even with the best treatment plans and meticulous execution.

The present case membrane perforations occurred but was managed by surgical technique suggested by Ali Hassani et al in 2012 [1,2,4,6,9]. In this technique fixing of perforated membrane to bony sinus wall makes suturing easier as main part of the suturing will be performed outside the sinus cavity and margins of the perforated membrane will be fixed to the bony sinus wall so stabilising membrane over hard bony wall.

The sinus graft is considered to be a safe treatment [6,9,11,12] Yet, all surgical procedures have the potential to develop postoperative complications. The sinus lift is a relatively complex operation compared to the simple implant placement. The longer duration and the additional tissues and sinus space involved increase its propensity for postoperative complications.

Studies suggest that there was no association between postoperative complications and implant survival. However, several studies suggest that postoperative infection is associated with implant loss [7,13,14,16]. Others report graft and implant loss subsequent to sinus infection [2,6]. In one study, post operative complications were associated with enhanced marginal bone loss [17]. Hence a particular regard was given to prevention of post op infection as frequent recall schedule immediately after surgery to detect and manage any such complication. The present case suggest that if complications like membrane perforations are managed properly then it has no influence on implant survival.

Conclusion

While implants have become the treatment of choice for replacement of missing teeth, tooth loss itself is a last resort following periodontal or other complications resulting in a reduced bone support. This has led to the use of the so-called "Advanced surgical procedures" in common practice. However, surgical skill and experience, inter patient variations and induction of newer equipment and methods complicate the scenario. Intraoperative complications may lead to postoperative complications and subsequently implant failure which was the end point for rehabilitation if not addressed in time. This case suggest that surgical complications did not significantly influence implant survival as consultation was sought immediately and preparations for

addressing the complications were made beforehand. The case with membrane tears had comparable results as the non complicated cases, hence proving that timely intervention with a set protocol irrespective of the extent of the perforation gives predictable results without significantly increasing the treatment time or number of surgical procedure

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