

## BONY COMPLICATIONS OF CHRONIC SINUSITIS

M. Masud UI Haq<sup>1</sup>, Shahid Hussain<sup>2</sup>

### ABSTRACT

**Objectives:** To study bony complications of sinonasal disease and its varied manifestations.

**Methodology:** In this five year retrospective study, cases with bony complications from 2003 to 2007 were collected and their records evaluated. Twenty cases were identified with bony complications.

**Results:** Maxilla was most common bone affected. Five patients were diagnosed as having acute osteomyelitis (35%); an equal number were diagnosed as having chronic osteomyelitis of which one had a fistula on the cheek and one had fistula due to tuberculosis. Odontogenic infections and chronic sinusitis each gave rise to two cases with osteomyelitis of the palate and maxilla. Chronic sinusitis was the main cause of frontal bone osteomyelitis in two cases, one of which had a discharging fistula in left frontoethmoid region displacing eye. Fungal sinusitis led to destruction of lamina papyracea. Acute osteomyelitis responded to antibiotics.

**Conclusions:** Polymicrobial infection is common, antibiotics are indicated initially. Surgery is considered when an abscess is revealed by CT and if it deteriorates clinically. Results suggest that FESS is effective for diagnosis and treatment of complications but can be combined with conventional surgery which is effective in management of refractory sinusitis.

**KEY WORDS:** Sinusitis, Bony complications, Osteomyelitis, Antibiotics, FESS, Caldwell-Luc.

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## INTRODUCTION

In developing countries, sinusitis is under treated. Morbidity and mortality has altered over the decade due to newer antibiotics. To compound the problems, these are prescribed by clinician, also self prescribed by patients and that too in low therapeutic doses and withdrawn on slight improvement. Maxillary is the commonest infected sinus. Exciting factors may be polyps, neoplasia, ostial obstruction, debilitating illnesses. Unilateral chronic maxillary sinusitis may be associated with foreign body in the maxillary sinus.<sup>1</sup> Maxillary sinusitis due to dental causes is secondary to periodontal/periapical infection<sup>2</sup> and suppurative facial lesion may be a sign of dental infection.<sup>3</sup> Complications arise due to spread through bony,

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vascular, perineural, lymphatics and are orbital, intracranial and bony involvement leading to muco/pyocoele, osteomyelitis/osteitis and dental root infections.<sup>4</sup> It is rare to see sinus discharging as open fistula on the face in modern world of antibiotics and surgery.

With improvement in economic and social conditions and use of antibiotics, we have enjoyed a decline in infections for several decades. It is now seen that bony complications of sinusitis presentations form a proportion of new cases, especially with diabetes and resurgence of fungal disease and some cases of tuberculosis. Therefore, it is important that clinicians are aware of bony complications and varied manifestations. We report increased incidence of isolated complications, its strange presentations and clinical manifestations over a five year period. History, examination, pus culture sensitivity and radiology were main investigations. Medical treatment was effective in acute cases. Surgery was opted in chronic cases.

### METHODOLOGY

In this retrospective study, cases with bony complications from 2003 to 2007 were collected and their records evaluated. Twenty cases were identified with bony complications at the department of otolaryngology and head and neck surgery, Lahore Medical and Dental College allied hospitals. Each patient underwent a detailed clinical examination and a battery of investigations. Most patients were treated with antimicrobial therapy; others required surgical intervention followed by extensive medical therapy. In addition, diabetics were treated with anti-diabetics and one with ATT respectively.

### RESULTS

Maxillary sinus, frontal sinus, ethmoids and sphenoid sinus were involved, in descending order of frequency; maxilla was the most commonly affected. Five patients were diagnosed as having acute osteomyelitis (35%); an equal number were diagnosed as having chronic osteomyelitis of which one had a fistula on the cheek (Fig-1) and one had fistula due to

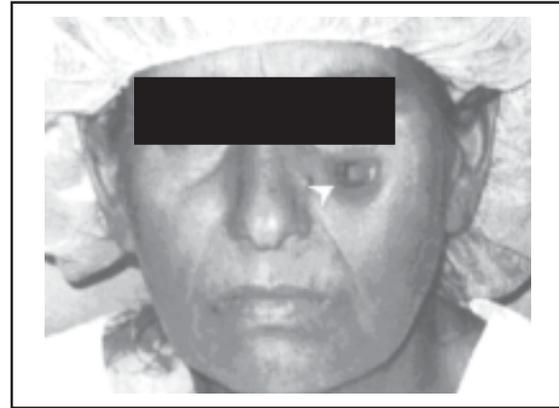


Fig-1: Maxillary cutaneous fistula.

tuberculosis (Fig-2ab). Odontogenic infections and chronic sinusitis each gave rise to osteomyelitis in two cases (10%) of the patients with osteomyelitis of the palate and maxilla combined of which one case had a fistula in the hard palate (Fig-3). Chronic sinusitis was the main cause of frontal bone osteomyelitis in two cases (10%), one of which had a discharging fistula in left frontal bone displacing the eye ball. Fungal sinusitis led to destruction of lamina papyracea and displacement of eye ball (Fig-4). Acute osteomyelitis leading to orbital cellulites responded to antibiotics. Corticosteroids were helpful in initial abortion of acute symptoms especially in fungal diseases. Sequestrectomy was carried out in all chronic cases but in cases of bony complications more radical surgery was performed including FESS and conventional reconstruction.

### DISCUSSION

Internet search revealed less than 50 articles on bony complications of sinusitis. In sinusitis; strept-staph, H.influenzae are early organisms while Pseudomonas aeruginosa, Moraxella catarrhails are late invaders.<sup>5</sup> Infections due to Pseudomonas aeruginosa are difficult to treat<sup>6</sup> and has the ability in sinusitis, at least in the presence of surgical intervention to involve bone at a distance from the site of primary infection in the absence of intervening mucosal disease.<sup>7</sup> Recent investigations of chronic sinusitis, recalcitrant to traditional medical and surgical therapy, indicate the gram-negative



Fig-2a: Tuberculous sinusitis.

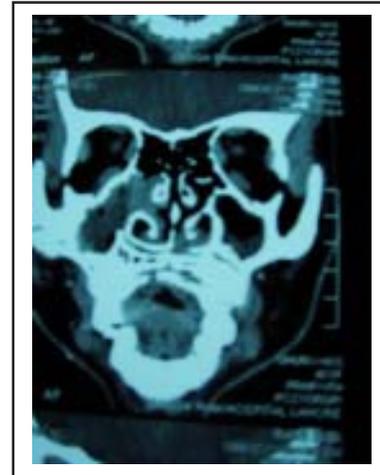


Fig-2b: CT of same patient.

bacteria are frequently involved commonly pseudomonas aeruginosa.<sup>8</sup> Comparing it with our cases, we had the problem of multiple drug resistant staph aureus and pseudomonas aeruginosa along with involvement in the form of removal of sequestrate, mucosa and granulation tissue. Till the infection is confined to sinuses it is called sinusitis. The spread of infection beyond the bony walls leads to complications. Maxillary sinusitis results in redness, swelling of cheek and eye lids, leading to subperiosteal abscess, bony necrosis/sequestrate and fistula. Endophthalmos and midface depression may occur in sinusitis. This process may be result of chronic maxillary hypoventilation with atelectasis of antrum secondary to chronic negative pressure.<sup>9</sup>

Chronic maxillary sinusitis can have different clinical presentations. In our cases it was

unusual bony complications, the patients initially had localized infections and unethical surgical or medical interventions, all contributed to the development of fistula draining externally or invading deeply, a rare clinical event in the modern era. CT is modality of choice for evaluating extent of disease and presence of focal mucosal thickening should prompt clinical and radiological assessment.<sup>3</sup> Plain radiography and dental advise were undertaken at first instance in our cases, although CT would have been ideal, but was not possible due to financial constraints in all cases. Odontogenic infections and chronic sinusitis each gave rise to osteomyelitis in 3 of 10 cases.

Almost 30% of the patients with osteomyelitis of the maxilla, chronic sinusitis was the main cause of frontal bone osteomyelitis in all 20 cases, tuberculosis 10 of 15 cases; 67%.<sup>10</sup> If otolaryngologist maintains a high index of suspicion, an early diagnosis can be made with simple investigations. Successful outcome

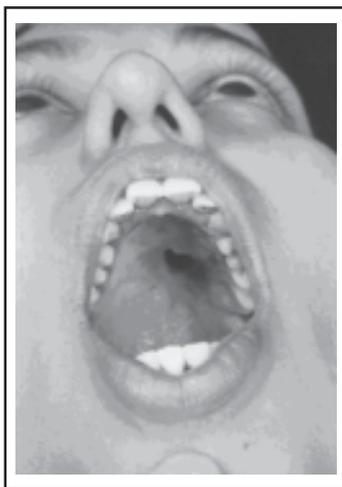


Fig-3: Palatal fistula.



Fig-4: Same patient, destruction of walls on CT.

depends upon appropriate chemotherapy and timely surgical intervention when necessary.<sup>11</sup> Patients with tuberculosis of head and neck must be investigated to exclude pulmonary or systemic disease.<sup>12</sup>

Rare localization of mucocoeles in maxillary sinus can be explained with width of maxillary ostia, infections of local anatomical structures should be operated with classic surgery.<sup>13</sup> Mucormycosis is saprophytic organism which can become pathogenic in specific conditions, particularly in patients with diabetes mellitus.<sup>14</sup> Pott's puffy tumor is associated with intracranial infection, early diagnosis can be obtained by CT, treatment is surgery and antibiotics against mixed pathogens.<sup>15</sup> Pott's puffy tumor has been reported in only 21 pediatric cases in the literature. A high degree of suspicion with neurosurgical intervention and appropriate antibiotics result in favorable outcomes.<sup>16</sup>

We treated our patient with a surgical abscess drainage followed by prolonged use of antibiotics and achieved complete therapy. The cellular and humoral elements of the immune system may be disrupted in diabetic patients resulting in such atypical courses and complications of infections. Evliyaođlu et al emphasized prompt diagnosis as intracranial invasion may cause neurologic problems and importance of surgical intervention tailored for individual lesion.<sup>17</sup> Orbital complications can cause orbital sepsis and cavernous sinus thrombosis, the "close-lying" connections, as seductive they are, should not divert from the rule: infrequent causes are infrequent and frequent causes are frequent.<sup>18</sup> Ho et al identified pathogens in 39%, two common being Staph and Strept, 13% had polymicrobial infection, 23 patients underwent sinus, orbital or intracranial surgery, including all five patients in stage IV, three of six patients in stage III, 13 of 35 patients in stage II, and two of 34 patients in stage I.<sup>19</sup>

Administering corticosteroids as an adjunct to antibiotics may accelerate the healing process in experimentally induced rhinosinusitis.<sup>20</sup> As regards surgery, Caldwell-Luc reduces oedema and inflammatory cells.<sup>21</sup> Patients treated with Caldwell-Luc operation need

reoperation in 7.3% cases. While in FESS group 27% need reoperation.<sup>22</sup> The post surgical effects of the removal of the maxillary sinus mucosa shows marked increase in acute and chronic inflammation, granulation, fibrosis and ulcerations.<sup>23</sup> If there is no autogenous bone material available, the problem is to find a suitable material for reconstruction, microtitanium mesh can be used for reconstruction of the walls of maxillary sinus.<sup>24</sup> Reconstruction is challenging, even more difficult problem when we compared this situation to our cases. Some otolaryngologists believe that Caldwell-Luc procedure should be used for unilateral chronic sinusitis, the results of this series suggest that endoscopic sinus surgery is an effective procedure for the diagnosis and treatment of unilateral chronic sinusitis.<sup>25</sup> Complication rate was 4.4% in the Caldwell-Luc group and 2.6% in the FESS group.<sup>26</sup>

## CONCLUSION

Infected mucocoeles, expand to local anatomical structures, should be operated with classic radical surgery. Fungal infection may have a poor prognosis. The contribution of frozen section for diagnosis and management should be adopted. Orbital complications due to sinusitis can cause orbital sepsis and fistula formation. Polymicrobial infection is common, broadspectrum antibiotics are indicated initially. Surgery should be considered not only when an abscess is demonstrated by CT but also if clinical deterioration occurs with adequate antibiotic treatment. Added steroids as an adjunct to antibiotics accelerate the healing process. The results suggest that FESS is an effective procedure for the diagnosis and treatment of bony complications but can be combined with conventional surgery like Caldwell-Luc which is effective in the management of refractory sinusitis after failed FESS or antrostomy. It should remain in our armoury. Revision of the maxillary sinus yields comparable outcomes to repeat Caldwell-Luc in patients with a history of past failed surgery. Endoscopic revision is a good alternative for surgical rehabilitation of bony complications.

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