Hyperostotic Chronic Sinusitis as an Indication for Outpatient Intravenous Antibiotics

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Abstract:

Objectives: There is a subset of patients with chronic rhinosinusitis (CRS) that demonstrate osteitis of the sinuses. Osteitic bone is evident on computed tomography (CT) as hyperostosis. We propose treatment of this entity with a six week course of outpatient intravenous antibiotics in an approach similar to that used in the orthopedic literature for long bone osteomyelitis. This group of patients can be identified based on symptoms, unrelenting course of disease, and imaging criteria. Although indications for the use of outpatient intravenous antibiotics must be determined judiciously in CRS we believe that hyperostotic sinusitis is an additional indication.

Study Design: A retrospective chart review.


Results: Ten patients (age range, 25-85) with hyperostotic sinusitis were identified and quality of life was evaluated with SNOT-22. All patients underwent both pre- and post- treatment nasal endoscopy and CT. All patients underwent revision surgery by senior author (VKA). Five patients were treated with 6 weeks of intravenous antibiotics. Antibiotic choices were culture directed and antibiotics administered included Cefazolin, Clindamycin, Ertapenem, Maxipime, and Vancomycin. Minor complications encountered during therapy included: paresthesias and elevated liver enzymes. Five patients, serving as the control group, were treated with traditional therapy involving intermittent and prolonged courses of oral antibiotics.

Conclusions: Prolonged intravenous antibiotics may achieve adequate serum levels that cannot be achieved with oral antibiotics. Symptomatic relief in patients with hyperostotic sinusitis appears superior with intravenous antibiotics versus traditional oral therapy. Indications for intravenous antibiotics should include hyperostotic sinusitis.

Introduction

• The mainstay of treatment for CRS is prolonged and repeated course of oral antibiotics, steroids, and decongestants
• When medical therapy fails, these patients proceed to surgery
• There remains a group of patients, however, that are refractory to both oral antibiotics and surgery
• It is theorized that these patients harbor an osteitis
• Sinus osteitis is characterized by:
  • Hyperostosis- diffuse bony thickening due to chronic inflammatory infiltrate, bone resorption, and osteogenesis
  • This cycle of resorption, osteogenesis, and fibrosis in setting of chronic sinusitis is similar to that observed in osteomyelitis
  • The orthopedic literature had demonstrated intravenous antibiotics as the cornerstone of long bone osteomyelitis treatment
  • It has been shown that there is a significant improvement in symptoms at week 15 after 2 weeks of pre-operative IV antibiotics, followed by surgery, than 6 weeks of post operative antibiotics
  • Intravenous antibiotics for 6 weeks in 45 patients who refused surgery also showed significant symptom improvement
  • The reported success of endoscopic sinus surgery is greater than 80%, despite this there remain patients that fail surgical cure
  • We thus hypothesize that a combination of intravenous antibiotics following surgery will improve patient outcomes in those with hyperostotic sinusitis

• Herein we review the role of intravenous antibiotics following surgery for patients with hyperostotic sinusitis versus surgery followed by traditional treatment with courses of oral antibiotics, irrigations, and steroids

Table 1: Results summary. All patients treated with IV antibiotics highlighted in cream while those treated with traditional therapy are highlighted in yellow.

<table>
<thead>
<tr>
<th>Patient</th>
<th>Age</th>
<th>Previous surgery</th>
<th>Revision surgery</th>
<th>Antibiotic Given</th>
<th>Organism (if available)</th>
<th>For treatment of SNOT</th>
<th>Post treatment SNOT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>46</td>
<td>multiple</td>
<td>Bilateral Osteoplastic Flap</td>
<td>6 weeks IV Cefazolin 1 gm</td>
<td>Serratia plymuthica</td>
<td>05</td>
<td>04</td>
</tr>
<tr>
<td>2</td>
<td>63</td>
<td>multiple</td>
<td>Revision sphenoidotomy bilaterally</td>
<td>6 weeks IV Ertapenem 1 gm, Vancomycin 1 gm BID</td>
<td>Diphtheroides epidermidis, Eshericia coli</td>
<td>29</td>
<td>29</td>
</tr>
<tr>
<td>3</td>
<td>68</td>
<td>multiple</td>
<td>Bilateral Revision Sphenoidotomy, unilaterally, inferior turbinate reduction</td>
<td>Multiple oral antibiotics and antibiotics irrigations</td>
<td>Fusarium solani</td>
<td>28</td>
<td>28</td>
</tr>
<tr>
<td>4</td>
<td>45</td>
<td>multiple</td>
<td>Bilateral Revision Ethmoidectomy, right inferior turbinate reduction</td>
<td>6 weeks IV Cefazolin 1 gm BID</td>
<td>No organism found</td>
<td>Lost to follow-up</td>
<td>Lost to follow-up</td>
</tr>
<tr>
<td>5</td>
<td>63</td>
<td>multiple</td>
<td>Right ostectomy flap, bilateral revision ethmoido/sphenoidotomy/divulsion</td>
<td>6 weeks IV Cefazolin 1 gm BID</td>
<td>Serratia marcescens</td>
<td>28</td>
<td>28</td>
</tr>
<tr>
<td>6</td>
<td>65</td>
<td>multiple</td>
<td>Revision Sphenoidotomy bilaterally and decompression mucosa</td>
<td>Multiple oral antibiotics and antibiotics irrigations</td>
<td>Serratia marcescens</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>7</td>
<td>49</td>
<td>multiple</td>
<td>Left Sphenoidotomy and lysis of adhesions</td>
<td>Multiple oral antibiotics</td>
<td>Serratia marcescens</td>
<td>28</td>
<td>28</td>
</tr>
<tr>
<td>8</td>
<td>66</td>
<td>multiple</td>
<td>Left revision ethmoidectomy</td>
<td>Multiple oral antibiotics</td>
<td>Serratia marcescens</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>9</td>
<td>48</td>
<td>multiple</td>
<td>Bilateral revision maxillary antrostomies, total ethmoidectomies, sphenoidotomy</td>
<td>Multiple oral antibiotics and antibiotics irrigations</td>
<td>Serratia marcescens</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>10</td>
<td>57</td>
<td>multiple</td>
<td>Right maxillary antrostomies and total ethmoidectomy with right inferior turbinate reduction</td>
<td>6 weeks IV Maxipime 750 mg po iv BID, Clindamycin 300 mg iv BID</td>
<td>Haemophilus influenzae, methicillin resistant staph aureus</td>
<td>30</td>
<td>30</td>
</tr>
</tbody>
</table>

Discussion

• All complications from intravenous antibiotics were minor and none required a change in antibiotic
• Both groups of patients had significant improvements in SNOT-22 scores
• This was likely due to the fact that both groups had revision surgery prior to either traditional oral therapy or intravenous antibiotics
• This study is limited by its retrospective uncontrolled design and the complicated nature of this disease
• The future of proving efficacy of intravenous antibiotics in patients with hyperostotic sinusitis in CRS is a randomized prospective study

Conclusions

• The role of intravenous antibiotics in the treatment of hyperostotic sinusitis requires further research
• Indications currently include resistant micro-organisms, intolerance of oral medications, and extranasal complications
• The safety and cost effectiveness of PICC lines and intravenous antibiotics has been established in the literature
• Intravenous antibiotics provide an excellent adjunct to care in patients with hyperostotic sinusitis
• Significant improvements in SNOT-22 scores were achieved in patients receiving intravenous antibiotic

References