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Topical therapy for refractory rhinosinusitis caused by methicillin-resistant *Staphylococcus aureus*: First report in a prospective series

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ABSTRACT

Objective: The incidence of refractory chronic rhinosinusitis (CRS) associated with methicillin-resistant *Staphylococcus aureus* (MRSA) is rising and remains a therapeutic challenge. The goal of this study is to demonstrate the efficacy of a non-invasive topical therapy against MRSA in these patients.

Methods: Seventeen patients with refractory CRS caused by MRSA were treated with a topical therapy protocol. Treatment consisted of weekly endoscopic sinus debridement followed by intra-sinus installation of a hydroxyl-ethylcellulose gel that releases mometasone and a culture-directed antibiotic for a period of 6 weeks, along with daily nasal nebulization of mometasone with the same antibiotic and saline rinses. Clinical outcome was assessed using the Lund–Kennedy (LK) symptom and endoscopic appearance scores. Sinus mucosal tissue was homogenized and cultured, and microbial biofilm burden was assessed based on colony forming units (CFUs) counts.

Results: Rhinotopic therapy resulted in clearance of MRSA in 13 of 16 patients (81.2%). Treated patients also demonstrated significant improvement clinically as measured by the LK scores. In addition, a significant decrease in mucosal CFUs was observed post-therapy.

Conclusion: Our findings demonstrate that topical therapy is an effective method for treating MRSA-associated refractory CRS.

1. Introduction

Prolonged use of oral antibiotics has led to an increased risk of antimicrobial resistance [1]. Methicillin-resistant *Staphylococcus aureus* (MRSA) infections have become a particular challenge as they have reached today almost epidemic proportions, with some reports of its isolation in more than 40% of Staph Aureus cultures in the US [2]. As related to the nose, nasal asymptomatic carriage has almost doubled in the US between 2001 and 2004, from 0.8 to 1.5% [3]. Whether this is associated with an increased risk for chronic rhinosinusitis (CRS) is not quite clear however. The prevalence of positive MRSA isolation form nasal cultures of CRS patients is on the rise. One study examining 392 cultures of sinonasal infections in the context of CRS showed 126 *S. aureus* isolates, of which 19%

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were MRSA [4]. CRS patients who undergo surgery seem to be most severely affected [5].

What ought the correct treatment to be when MRSA is recovered from the sinonasal passage remains controversial. While colonization does not necessarily imply needing to treat, detecting the organism on culture in the setting of acute sinonasal inflammation deserves treatment; however eradication of these bacteria does present a therapeutic challenge [6]. Prolonged intravenous (IV) antibiotic treatment has produced variable results with a high number of patients experiencing adverse side effects [7,8]. A treatment regimen consisting of a combination of oral and topical antibiotics has been reported to have some success in MRSA eradication [9]. Topical therapy alone in the setting of recalcitrant non MRSA-related CRS was recently described to reduce costs and to carry lower side effects as compared to oral or IV antibiotics [10]. For MRSA recalcitrant CRS, topical therapy was reported in 2 studies to date [11–13]. However exact conclusions are difficult to make, as one of the studies included only 2 patients [13], and in the other study, the subjects also received additional oral antibiotics [12]. The objective of the current study is to report on our experience with topical therapy alone in treating 17 patients with recalcitrant MRSA CRS.

2. Material and methods

This is a prospective study that included 17 patients with MRSA-associated recalcitrant CRS. All patients were over 18 years of age, had previously undergone endoscopic sinus surgery and had persistent signs and symptoms of CRS despite maximal medical therapy, which included oral antibiotics and nasal steroids sprays. Nasal endoscopy showed thick debris and purulence in all patients, despite widely patent sinus cavities. Endoscopically guided cultures were taken for all patients from the infected mucosa of the ethmoid or maxillary sinus cavities, confirming MRSA infection. All patients were placed on the rhinotopic therapy protocol, a regimen that had previously shown to be safe and effective against refractory CRS caused by various microbial species [14–16]. This protocol consisted of weekly endoscopic sinus debridement done in the office followed by intra-sinus installation of a hydroxyl-ethylcellulose gel that was specially prepared by a local compounding pharmacy, and that released a culture-directed antibiotic, along with mometasone. A total of 5 ml of gel was paced on each side, filling the maxillary cavity, the ethmoid cavity, the fronto-ethmoidal recess and the sphenoid cavity. The patients were instructed to start daily nasal saline rinses using a NeilMed Sinus rinse kit, starting 48 h after the gel placement, along with twice daily nasal nebulization of mometasone and the same culture-directed antibiotic (Fig. 1). The regimen was continued for 6 weeks, and a new culture was taken from the patients' ethmoid/maxillary cavities, one month post-treatment in order to check on the status of the MRSA eradication. All patients were followed up to 12 months after completion of therapy.

Liberty-institutional review board (IRB) approval was obtained for this study (#09.01.0012).

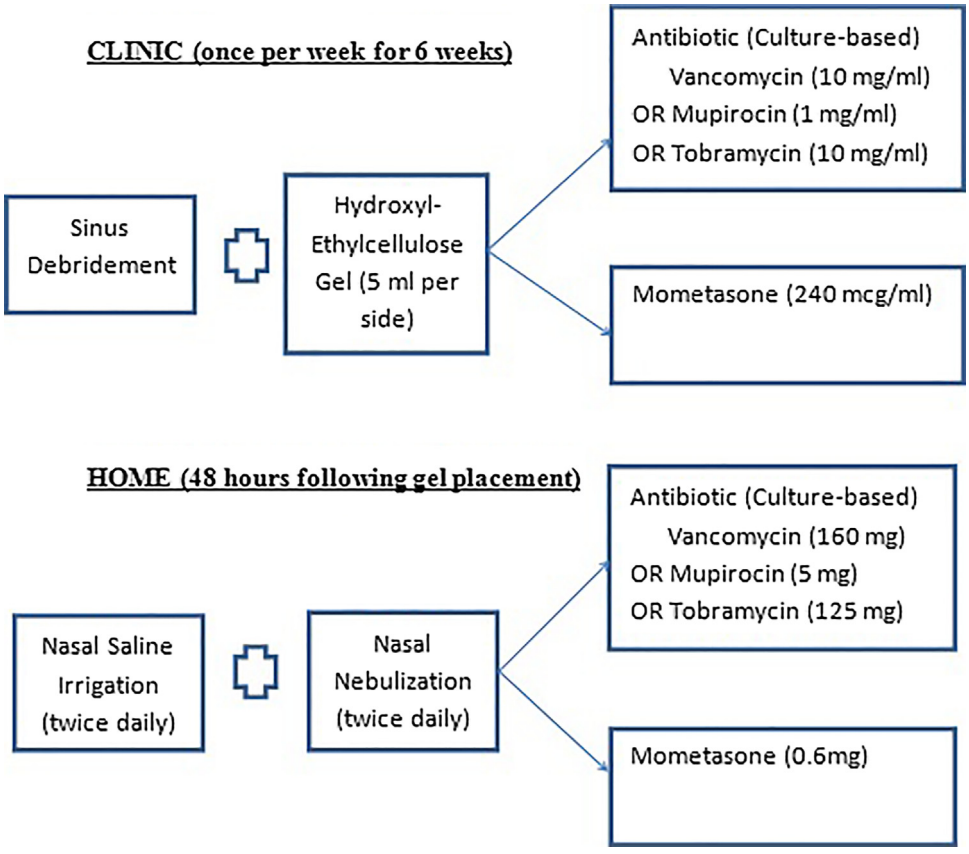

Fig. 1. Rhinotopic protocol.

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