Preoperative Prevalence of Methicillin-Resistant Staphylococcus Aureus (MRSA) colonization in Patients Undergoing Intranasal Surgery

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Abstract

Methicillin-resistant Staphylococcus aureus (MRSA) has been shown to be endemic in virtually all United States health care facilities, with prevalence of colonization and infection sharply increasing. Patients undergoing intranasal surgery with preoperative MRSA colonization may be at increased risk of acquiring a more serious infection. While overall hospital populations have been studied, there has been no study to date evaluating the prevalence of MRSA specifically in this at-risk population. This study was designed to determine the prevalence of MRSA among those undergoing intranasal surgery in order to quantify a potential source of subsequent sino-nasal infections following these procedures.

Introduction

Staphylococcus aureus is part of the normal flora of the nasal vestibule and nasal cavity in many patients. Methicillin-resistant Staphylococcus aureus (MRSA) was first described in the early 1960’s, soon after methicillin became available for clinical use. Resistance is conferred by a mutation in the mecA gene, which encodes a novel penicillin-binding protein, PBP2a.1 Prevalence rates of MRSA have risen steadily since its emergence as a clinical entity, though these rates have risen more dramatically over the past decade. In the general population, carriage rates of MRSA hover around 1%, though this figure is markedly higher in hospitalized patients, and higher still in patients in intensive care units.2-4 Among patients admitted to a hospital, the rates of carriage are between 4-7%, while among patients is an intensive care unit, rates rise to greater than 20%. The number of MRSA isolates as a proportion of the total Staphylococcus isolates varies considerably from hospital to hospital. At our institution, MRSA accounts for 30% of all staphylococcal species isolated and 52% of Staphylococcus aureus species.

MRSA has been shown to be an important nosocomial pathogen with infections conferring significant morbidity and mortality. Most MRSA infections originate from organisms within the anterior nares with nasal carriage believed to be the primary ecological reservoir.5-7 While post-operative surgical site infection with MRSA is not uncommon in other surgical disciplines, within the field of otolaryngology, and specifically after intranasal surgery, these infections are relatively rare. There are, in fact, no reported cases in the literature of post-septoplasty or rhinoplasty MRSA infections, despite incisions in areas of potential colonization of MRSA. It has been suggested that prophylactic treatment of nasal carriers of MRSA may reduce postoperative surgical site infection.8,9 However, given the relatively low incidence of infection following intranasal surgery, these benefits have not been described for intranasic procedures. Further, the role of MRSA in nasal infections, even in the absence of surgery, remains unclear.

This study was designed to determine the prevalence of MRSA among those undergoing intranasal surgery in order to potentially identify a population at risk for subsequent infection.

Methods and Materials

One hundred forty nine patients undergoing elective outpatient and impatient intranasal surgery at an urban, tertiary care university hospital over a 6 month period were evaluated in this study. All patients were informed of the study risks, benefits and alternatives to participation in the study and signed an informed consent as required by the hospital’s institutional review board (IRB). Prior to the procedure, the patients were asked to fill out a brief, self-instrumented questionnaire to determine their health history including residence in a long term care facility, antibiotic use and the presence of implanted devices. Following induction of anesthesia and endotracheal intubation, cultures were taken of the anterior nares and nasal vestibule prior to the application of topical decongestants or injection of a local anesthetic agent. Culturettes were sent to the institution's microbiology laboratory where they were smeared on a BBLTM CHROMagarTM MRSA medium. Within forty-eight hours, cultures were finalized. The primary endpoint was positive culture of methicillin-resistant Staphylococcus aureus (MRSA).

Results

One hundred and forty-nine patients—78 females (52%) and 71 males (48%)—were included in this study. Patients ranged in age from 12 to 87 years, with a mean age of 43. The patients included in the study underwent a number of intranasal procedures, with the vast majority of cases consisting of endoscopic sinus surgery, septoplasty and septoplasty (Figure 2). Most patients underwent multiple intranasal procedures, though only the primary procedure is listed.

Of the 149 patients included in the study, 2 (1.3%) were found to have positive MRSA nasal cultures (Figure 3). Each of the two patients with positive cultures had a history of MRSA infection, with one having had a history of hospitalization within the last year, and the other with a history of surgery within the past year.

Results of the patient questionnaire revealed a high rate of antibiotic use (72% of patients reporting antibiotic use during the past year and a mean length of time since last antibiotic usage of 2.3 months. Further, we found that a relatively high proportion of the study group had a history of hospitalization during the past year (20%), and had a history of recent hospitalization.

Discussion

With prevalence of methicillin-resistant Staphylococcus aureus on the rise nationally, there has been a paradigm shift in terms of the treatment of asymptomatic carriers. Post-operative infections following cardiothoracic and abdominal surgery are well documented and in some centers have led to the implementation of antimicrobial prophylaxis with mupirocin. However, there is a paucity of data regarding MRSA infections following rhinologic surgery. This study evaluated the role of colonization of MRSA among patients undergoing intranasal surgery and found that only 2/149 patients had positive cultures preoperatively. Based on low rates of MRSA colonization of the anterior nares and nasal vestibule in patients undergoing intranasal surgery, as well as the rarity of post-operative MRSA infections in the nose, antimicrobial prophylaxis is likely of little benefit.

Figure 2. Procedures undergone by study population

Figure 3. Culture Results as a proportion of patients with a history of MRSA

Histology of MRSA

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