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EVALUATİON OF ANTİBİOTİC USE İN SEPTORHİNOPLASTY CAUSED BY METHİCİLLİN-RESİSTANT STAPHYLOCOCCUS AUREUS: A CASE REPORT

Ömer Akgül*

Department of Pharmaceutical Microbiology, Faculty of Pharmacy, Van Yüzüncü Yıl University, VAN, Turkey.

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***Corresponding Author: Ömer Akgül**
Department of Pharmaceutical Microbiology, Faculty of Pharmacy, Van Yüzüncü Yıl University, VAN, Turkey.
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ABSTRACT

Septorhinoplasty is a commonly performed procedure for facial aesthetics and obstructed nasal breathing. There have been only 4 reported cases of methicillin-resistant Staphylococcus aureus (MRSA)eassociated postoperative complications following septorhinoplasty reported in the literature across all specialties. In this article, we report a case of MRSA-associated infection after an uncomplicated septorhinoplasty. Risk stratification and outcome of treatment are described, followed by a review of the current literature.We discuss the epidemiology of MRSA colonization, prophylactic use of antibiotics in septorhinoplasty, previously reported MRSA-associated septorhinoplasty infections, and management of complications. There are no current standards for MRSA decolonization before septorhinoplasty. Finally, we offer recommendations for patients at high risk for MRSA infection undergoing septorhinoplasty and considerations for treatment of MRSA infections should they occur after septorhinoplasty.

KEYWORD: MRSA, Antibiotic resistance, Septorhinoplasty.

INTRODUCTION

Septorhinoplasty is one of the most common ambulatory procedures performed by facial surgeons.[1,2] Despite increasing nasal colonization with virulent organisms, such as methicillin-resistant Staphylococcus aureus (MRSA), infection rates remain less than 2.3% for these procedures without the use of prophylactic antibiotics.[3-7] Although patients colonized with MRSA are at an increased risk for surgical site infection, few cases of MRSA-associated infections after septorhinoplasty have been reported.[4,5,8-11]

S. aureus is responsible for the highest rate of nosocomial infections.[7] Shortly after the introduction of methicillin in the 1960s, S. aureus resistance to methicillin developed via acquisition of a mecA gene mutation, which encodes penicillin-binding protein 2a.[9,12,13] In 1983, MRSA prevalence was 5% in large hospitals, but by 1991, prevalence rates in hospitals approached 30%.14,15 S. aureus colonizes 20% to 30% of the general population, whereas MRSA is found in only 1.5%. Colonization risks are highest in patients with previous MRSA colonization, intensive care unit admissions, hospitalizations in the last 12 months, longterm care facility residency, dialysis or infusion therapy, antibiotic therapy in the last 3 months, hospital admissions for skin or soft tissue infections, and HIV infection.[16-19] Community-associated MRSA outbreaks have been observed in various populations, such as sports teams, military personnel, and prison inmates.[20-23] These cases have led to poorly predictive risk factors, including skin trauma, sharing contaminated equipment, intravenous (IV) drug abuse, and incarceration.

One significant consequence of MRSA colonization is the demonstrated risk of surgical site infections.[8] Health careeassociated MRSA (HA-MRSA) infections are defined as those occurring more than 48 hours after hospitalization or outside the hospital in those who have had health care exposure in the previous 12 months.[24] Community-associated MRSA (CAMRSA) infections are those occurring without prior health careerelated exposure. However, the etiology of MRSA infections is becoming increasingly vague as colonization rates rise in the community and as patients are being exposed to an increasing numbers of risk factors. We present a case of an MRSA-associated infection following an uncomplicated septorhinoplasty performed on an incarcerated male.

CASE REPORT

A 42-year-old incarcerated man presented for an uncomplicated open-approach septorhinoplasty for posttraumatic nasal obstruction caused by multiple nasal fractures. The patient had no significant past medical history other than a smoking history of 0.8 packs per day for 18 years. He had a 74-day history of incarceration after an altercation with police. As a result of that altercation, he sustained a right subcondylar fracture treated 25 days after the injury with open reduction and internal fixation via a transmasseteric approach. Eleven days postoperatively, he presented with incision dehiscence and purulence. After incision and drainage, microbiology culture was obtained, iodoform gauze was packed into the site, and he was placed on a regimen of clindamycin 300 mg four times daily for 1 week. Culture results were suggestive of oral flora, revealing few gram-positive cocci, few gram-negative rods and coccobacilli, and rare gram-negative diplococci. Susceptibility was not obtained but the infection was responsive to clindamycin. The incision healed without complications. Thirty-one days after the resolution of his infection and completion of his clindamycin regimen, he presented for septorhinoplasty.

A single dose of preoperative cefazolin injection (Ancef; GlaxoSmithKline) was provided. The procedure consisted of bilateral osteotomies, dorsal humpreduction, septoplasty, spreader grafts, and tip-defining sutures. A Denver splint was placed, and bacitracin-impregnated Doyle splints were inserted and secured with a single transseptal 2-0 silk suture. Postoperatively, the patient was prescribed the following: acetaminophen/hydrocodone (Norco) and amoxicillin/clavulanate (Augmentin) 500 mg and 125 mg, respectively, every 12 hours for 5 days, and bacitracin to his incisions for 5 days. Follow-up was arranged for 5 days later.

The patient was transferred from the penitentiary to his follow-up appointment on postoperative day 6, which was 1 day later than scheduled. His Denver and Doyle splints were removed. The patient reported that he had not received any of his medications; however, he reported decreased pain and swelling. On examination, the patient exhibited

normal healing without evidence of infection, and the patient returned to the penitentiary. On the postoperative day 11, the patient returned for his follow-up appointment. He was experiencing new pain, increased swelling, and persistent drainage from his nose. Physical examination revealed generalized nasal edema, fluctuance with slight erythema at the nasal base, and purulent drainage from his marginal and columellar incisions. He remained afebrile, and his vital signs were stable. Samples for aerobic, anaerobic, and fungal cultures were obtained from the purulent drainage.

He was admitted to the hospital and placed on IV ampicillin/ sulbactam (Unasyn; Pfizer Inc.). Computed tomography demonstrated the infection was localized to the nasal region without sinus involvement. The patient was taken to the operative suite for incision and drainage under general anesthesia. The marginal and columellar incisions were opened, and the cartilage grafts were removed. After saline irrigation, the incisions were packed with sterile iodoform gauze. The infectious disease service was consulted, and daptomycin 6 mg/kg and piperacillin/tazobactam (Zosyn; Pfizer Inc.) were recommended, pending definitive cultures. Two days later, the patient returned to the operating suite for irrigation and debridement. No purulence was expressed. Plain gauze packing was performed, extending externally through the marginal incisions. The columellar incision was closed to promote cosmesis. The patient continued to improve, and the packing was removed 2 days later.

The cultures demonstrated growth of MRSA, and HIV antibody screening with fourth-generation enzyme-linked immunosorbent assay was negative. The infectious disease service provided the final recommendations of IV daptomycin 6 mg/kg for 4 weeks followed by 2 weeks of oral minocycline. A peripherally inserted central catheter line was placed. He remained an inpatient because the penitentiary was unable to arrange for IV antibiotic administration. One week later, examination revealed well-healed incisions without edema. The patient reported greatly improved breathing without any discomfort compared with his preoperative condition. However, the final cosmetic result involved widening at the nasal base secondary to osteotomy site healing in the presence of underlying tissue edema. At the time of discharge, no evidence of infection was seen. At the 2-week and 2-month follow-up appointments, similar findings were appreciated.

DISCUSSION

A review of the literature revealed 4 previously reported cases of MRSA-associated septorhinoplasty infections, including 2 patients at high risk for MRSA infection and 2 patients without clear risk factors.[4,9-11] Factors that identified the 2 patients as high risk included extensive health care contact and a prior MRSAassociated infection.[4,9] One of the 2 patients without identifiable risk factors had an external lateral osteotomy, and the MRSA infection was attributed to the osteotomy site.[11] Our patient presented with both lowrisk and high-risk factors for MRSA colonization because of his incarceration, recent hospitalization, and a recent antibiotic regimen. Of the 4 previously reported cases, 1 patient presented 4 days postoperatively,[11] 2 patients presented 6 days postoperatively,[4,10] and our patient presented 11 days postoperatively. There was no consistency among the patients with regard to nasal splinting or packing.

Infections associated with septorhinoplasty are uncommon, attributable to surgery in an anatomic location of high local vascularity and typically performed on a relatively young and healthy population.[13] The rare instances of infection may be attributed to proliferation of the patient's underlying flora, including previous inoculation with MRSA. Although not specific to MRSA-associated infections after septorhinoplasty, possible local complications include scar formation,

nasal tip droop, septal perforation, and saddle nose deformity, as well as various systemic complications, which are beyond the scope of this review.[2,25]

Because of the low incidence of MRSA colonization and rarely reported MRSA-associated infections after septorhinoplasty, use of preoperative screening and decolonization is not recommended but will be discussed here for completeness.[8] It is understood that administration of antibiotics used for widespread decolonization, such as mupirocin, may select for the development of mupirocin-resistant bacterial strains.[26,27] Mupirocin is a protein synthesis inhibitor, selectively binding bacterial isoleucyl transfer-RNA synthetase.[27] Its overuse for MRSA is not only selective of resistant strains but also creates more high-level mupirocin resistance in MRSA than in methicillin-sensitive S. aureus. However, screening of patients, particularly those at risk for MRSA colonization, allows for targeted therapy, decreased treatment costs, and minimal possible side effects. MRSA can colonize the nares, followed in frequency by the gastrointestinal tract and skin. Nasal MRSA colonization demonstrates an increased risk of MRSAassociated infections. Therefore, nasal MRSA screening is currently the most powerful method in identifying patients at risk for developing MRSAassociated infections.[8,28-30] MRSA colonizes alternative sites in the absence of nasal colonization, including the oropharynx. In the situation of a negative nasal screening result, oropharyngeal colonization is not excluded and may be a source for development of a subsequent infection.[31] Materials and techniques employed during screening produce variable results. Swabs with nylon-flocked tips or cellular foam tips have increased MRSA detection rates compared with traditional rayon swabs.[32] The nasal swabbing technique directly affects detection rates; therefore, use of proper technique is paramount.[33]

Antibiotic combinations for MRSA decolonization have been evaluated with variable results. One study demonstrated effective decolonization of MRSA using 2 to 3 courses of a 5-day regimen consisting of mupirocin nasal ointment twice daily, chlorhexidine mouth rinse, and full-body wash with chlorhexidine soap.[12] Other studies revealed that full-body chlorhexidine alone is not effective.[34,35] Complete nasal decolonization with the use of topical mupirocin and oral vancomycin has been reported.[36] Specifically, mupirocin has been demonstrated to be safe with minimal negative side effects, and oral vancomycin has a low-risk for developing vancomycin-resistant enterococci, unlike IV vancomycin.[37] A 5-day course of twice daily mupirocin alone can be effective for decolonization.[38] However, recolonization may occur as early as 1 week; therefore, surgery should be scheduled immediately after decolonization. Rapid recolonization, mupirocin resistance, persistence of gastrointestinal MRSA colonization without oral antibiotics, and lack of compliance with complex regimens are potential adverse events that may follow decolonization.[9,12,26,38]

Prophylactic use of antibiotics in MRSA carriers is not without consequences. The antibiotic resistance of S. aureus has been demonstrated to be a result of selective pressure of antibiotics.[39,40] It has been shown that both CA-MRSA and HA-MRSA are associated with previous use of particular antimicrobial prescriptions given in the community in the past 1 year.[40] The highest risk exists with fluoroquinolones, although cephalosporins and macrolides also present an increased risk.[40-42] Proper and limited use of antibiotics throughout the community can reduce CA-MRSA and HA-MRSA infections. One study demonstrated that MRSA colonization rates actually increased in its patient population after postoperative antibiotic therapy for sinus surgery, likely as a result of the removal of methicillin-sensitive S. aureus allowing for the proliferation of MRSA.[43] Treatment of MRSA infections should be based on culture and sensitivity, and empiric therapy be based on antibiotics that have demonstrated success in that community.4

The use of prophylactic antibiotics in MRSA carriers is well supported in surgical patients with head and neck cancer because of their long hospitalization, age, and an immunocompromised state.[13] Indications for preoperative antibiotic use in septorhinoplasty include prophylaxis to prevent septicemia in patients with valvular heart disease and those who are immunocompromised.[6] In addition, patients with complex revision septorhinoplasties requiring free tissue transfers have been shown to benefit from prophylactic antibiotics because of their greater risk of infection.[44] However, patients undergoing endonasal septorhinoplasty with autologous cartilage grafts have not been shown to benefit from reduced infection rates with prophylactic antibiotics.[2] When nasal packing is used, it should be supplemented with antibiotic ointment and removed as early as indicated.[6] Abscesses, which may form as a result of nasal packing, should be incised if they are not draining spontaneously.[25] Although it has been suggested that systemic antibiotics be provided to supplement unusually long nasal packing times to avoid septic shock,6 multiple studies have shown that the onset of toxic shock syndrome is not delayed by antibiotic administration.[2] In a review of reported MRSA-associated septorhinoplasty infections, patients were shown to respond well to culture-driven susceptible antibiotic regimens, resulting in minimal to attributable long-term functional or cosmetic consequences.[4,9]

Currently, there are no standards for MRSA decolonization before septorhinoplasty. Due to the low incidence of MRSA colonization and the low incidence of MRSA-associated infections in septorhinoplasty, there is inadequate evidence to suggest any benefit of preoperative MRSA screening or decolonization, although some authors have recommended screening and topical mupirocin for colonized patients.[5,8] In the setting of an initial or complicated revision rhinoplasty in patients at high risk for MRSA infection, the necessity of such an elective procedure should be considered on the basis of the guidelines discussed in this article. The purpose of this case report is to contribute to the body of literatüre if the incidence of this complication increases. In such circumstances, consideration may need to be given to preoperative screening, decolonization with mupirocin with or without systemic antibiotics, followed by surgery within 1 week of decolonization to minimize the risk of recolonization, as discussed above.[4,5,44] Currently, careful case selection and treatment of any MRSA-associated infections postoperatively should continue to be the standard of care, with the literatüre only demonstrating benefit in preoperative antibiotics in patients with valvular heart disease, those in immunocompromised states, and those undergoing complicated revision septorhinoplasty with free-tissue transfers.[6,44] The treatment of MRSA-associated septorhinoplasty infections is incision and drainage of the indicated areas with concurrent culture and sensitivity testing. Empiric antibiotic therapy followed by sensitivity-specific regimens should be administered, with consideration of infectious disease consultation. Provided careful consideration is given to infectious complications, septorhinoplasty can continue to be a safe and cosmetically enhancing procedure.

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