**Efficacy of Doxycycline Monotherapy in Treating Rhinoscleroma**

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**Abstract**

Rhinoscleroma, also known as Mikulicz disease, is a chronic granulomatous infection of the nasopharyngeal mucosa causing disfigurement and debilitation. A 27-year-old male presented with nasal mass and obstruction. Histopathology revealed dense, diffuse, mixed inflammatory infiltrate consisting of neutrophils, lymphocytes, plasma cells, and foamy macrophages. Mikulicz cells which are foamy macrophages containing filamentous, granular, and fragmented bacilli were seen. The patient was diagnosed as rhinoscleroma and was started on capsule doxycycline 100 mg twice daily. After 6 weeks, marked improvement in the lesions and symptoms was noticed.

**Keywords:** Doxycycline, efficacy, Mikulicz cells, rhinoscleroma

**INTRODUCTION**

Rhinoscleroma is a rare chronic slowly progressive inflammatory condition caused by bacteria called *Klebsiella rhinoscleromatis*. The organism was identified by von Frisch in 1882. The histological features of rhinoscleroma were first described by Polish Surgeon Johann von Mikulicz in Wroclaw in the year 1877. We present a case of rhinoscleroma who responded to doxycycline remarkably within 6 weeks.

**CASE REPORT**

A 26-year-old male came with complaints of mass in the bilateral nostrils progressively increasing in size and extending into the pharynx for the past 2 years. The patient also had difficulty in breathing, alteration of voice, and difficulty in eating and swallowing due to nodular lesions over the palate. On examination, pinkish nasal masses filling both the nostrils were seen [Figure 1]. They were woody hard in consistency and tender and did not bleed on touch. Similar lesions were present over the palate. Hematological and biochemical investigations were within normal limits. Nasal swab stained for acid-fast bacilli was negative. Fungal culture and sensitivity were negative. Histopathological examination revealed dense, diffuse, mixed inflammatory infiltrate consisting of neutrophils, lymphocytes, plasma cells, and foamy macrophages. Foamy macrophages containing filamentous, granular, and fragmented bacilli known as Mikulicz cells were seen [Figure 2]. Russell body could also be appreciated. The patient was then started on capsule doxycycline (100 mg) twice daily. After 6 weeks, there was symptomatic relief with marked resolution of lesions [Figure 3].

**DISCUSSION**

Rhinoscleroma is a chronic granulomatous condition of the nose and other structures of the upper respiratory tract.11 It...
is contracted by means of direct inhalation of droplets or contaminated material. Rhinoscleroma usually affects the nasal cavity, but lesions can also be found on larynx, nasopharynx, oral cavity, paranasal sinuses, or soft tissues of the lips, nose, trachea, and bronchi. Nose is the most common site (95%–100%) as seen in our case. It usually starts in the subepithelium of the nasal mucosa, spreading thereafter to other areas, such as the subepithelium of the pharynx, which is involved in 50% of cases. Extension to the oral cavity or oropharynx is seen in 18%–43% of patients. Factors predisposing are crowding, poor hygiene, poor nutrition, and intimate contact. The disease most frequently affects persons in the 20–40 years of age range. These patients complain of nasal obstruction, rhinorrhea, epistaxis, dysphagia, nasal deformity, anesthesia of the soft palate, difficulty in breathing, stridor, dysphonia, and anosmia.

The disease manifests as three phases: exudative, proliferative, and fibrotic (cicatricial). The exudative phase presents as watery nasal discharge and crusting (catarrhal stage). The lesions evolve into noduloulcerative lesions involving the nose, upper lip, palate, and adjacent regions of the upper respiratory tract (granulomatous stage). With further progression of the disease, there is destruction of the nasal cartilages resulting in deformity (Hebra nose). This leads to fibrosis and subsequent obstruction (sclerotic stage). The differential diagnosis of rhinoscleroma includes vasculitis, lymphoma, extranodal Rosai–Dorfman disease, and nasal polyposis.

It is difficult to eradicate the disease and recurrences are common, and so, treatment of the disease poses a big challenge. *In vitro* studies have shown that clinically achievable concentrations of amoxicillin-clavulanate, chloramphenicol, trimethoprim-sulfamethoxazole, cephalosporins, streptomycin, tetracyclines, and ciprofloxacin inhibit the growth of *Klebsiella rhinoscleromatis*. Antibiotics such as streptomycin, doxycycline, tetracyclines, rifampicin, second- and third-generation cephalosporins, sulfonamides, and clofazimine have demonstrated their efficacy *in vivo*.

Some studies have suggested improvement in the disease with local application of rifampicin. *K. rhinoscleromatis* being intracellular bacterium prolonged courses of rifampicin, and fluoroquinolones are also efficacious as these antibiotics achieve high concentrations in macrophages. The total period for which antibiotic has to be administered is different in different studies; however, most conclude that long-term therapy for months and sometimes years is necessary to prevent relapses. Comparison of various drugs used in the treatment of rhinoscleroma is depicted in Table 1. Historically, tetracycline was preferred due to its low cost and efficacy. However, doxycycline is better over tetracycline in terms of easy dosing, better patient compliance, and quicker response time. Currently recommended treatment regimen is a combination of ciprofloxacin and doxycycline for at least 6 months. Although combination therapy is preferred by some as relapse is seen commonly with this infection, ciprofloxacin monotherapy has shown excellent clinical efficacy and reports of cure with this drug also exist in literature. The current case showed marked response to doxycycline monotherapy in terms of disappearance of symptoms and resolution of the lesions in 6 weeks.

**Conclusion**

Although tetracycline has been conventionally used for the treatment of rhinoscleroma, the lengthy duration of treatment (months to years) often leads to poor compliance and increased incidence of adverse events. Doxycycline monotherapy may be equally efficacious, may require lesser duration of treatment, and may have minimal compliance issues and fewer adverse events. Further research into the use of doxycycline monotherapy and trials comparing various antibiotics for this uncommon, but infectious condition would be of interest.

**Declaration of patient consent**

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients...
Table 1: Comparison of various drugs used in rhinoscleroma

| Drug             | Dosing                  | Advantage                                                                | Disadvantage                                                                 |
|------------------|-------------------------|--------------------------------------------------------------------------|------------------------------------------------------------------------------|
| Streptomycin     | 1 g daily               | Useful in active proliferating growth phase of *Klebsiella rhinoscleromatis*[^8^] | Vestibular toxicity                                                          |
|                  |                         |                                                                          | Resistance to treatment                                                      |
|                  |                         |                                                                          | Longer duration[^9^]                                                         |
|                  |                         |                                                                          | Frequent dosing                                                             |
|                  |                         |                                                                          | Hepatotoxicity                                                              |
|                  |                         |                                                                          | Flu-like symptoms                                                           |
|                  |                         |                                                                          | Requires monitoring of toxicity                                              |
| Tetracycline     | Four times daily        | Advantage of oral dosing over intramuscular streptomycin                 |                                                                              |
|                  |                         |                                                                          | Longer duration                                                             |
| Rifampicin       | 600 mg daily            | One of the most effective antibiotic[^10^]                                |                                                                              |
|                  |                         |                                                                          | Drug rash                                                                   |
| Ciprofloxacin    | Twice daily administration | Efficacy against Gram-negative organism                                    | Gastrointestinal symptoms                                                    |
| (250-500 mg)     |                         | Greater tissue penetration[^11^]                                         | High cost[^10^]                                                             |
| Doxycycline      | Twice daily administration | Less duration of treatment as compared to tetracycline                    | Cannot be administered to pregnant women and children                        |
| (100 mg)         |                         | Less frequency of dosing, hence patient compliance                       |                                                                              |
|                  |                         | Cost-effective                                                            |                                                                              |

understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest
There are no conflicts of interest.

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