Reminder of important clinical lesson

Actinomycosis and tonsillar disease

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Summary

A 10-year-old female presented with complaints of submandibular swelling, sore throat, painful deglutition, difficulty in speech and fever. The patient gave history of recurrent tonsillitis associated with snoring and breathing difficulty during sleep. Oral examination revealed inflamed, hypertrophied tonsils and dental caries. Throat swab culture was positive for β -haemolytic streptococci. The patient underwent elective tonsillectomy and histopathological examination revealed characteristic colonies of actinomycetes. The patient was put on intravenous penicillin and after 6 months of follow-up is disease free. The report recommends that histopathological examination must be performed in cases of recurrent tonsillitis with tonsillar hypertrophy. Microscopic examination may reveal actinomycetes which may not be evident on culture; treatment requires a longer course of high-dose penicillins. This further supports the view that actinomycetes have a causal association with recurrent tonsillitis and tonsillar hypertrophy.

BACKGROUND

Actinomyces are filamentous branched bacteria, living as commensal organisms in the oral cavity. They become invasive when they gain access to the subcutaneous tissue, through a mucosal lesion; the common predisposing conditions being dental caries, dental manipulations and maxillo facial trauma.¹

Although actinomycosis has been identified in resected tonsils, its possible role in adenotonsillar disease is still open to debate. Studies by Ozgursoy *et al* and Pransky *et al* have postulated a role of actinomycetes in recurrent tonsillitis and tonsillar hypertrophy whereas works of van Lierop *et al* and Gaffney *et al* did not find any causal association.^{2–5}

Actinomycosis can be diagnosed by positive cultures, sulphur granules or on biopsy specimens.⁶ But the organism is difficult to culture with less than 50% recovery rates.⁷ Macroscopic examination finding of sulphur granule in tissue specimens or drainage sites are suggestive of disease.⁸ However, characteristic histopathological findings can identify actinomycoses.⁹

The case presents the clinical and histopathological features of actinomycosis and its possible role in aetiology of recurrent tonsillitis and tonsillar hypertrophy. Histopathological examination in such cases is essential as actinomycetes may not be evident on culture, as compared to other pathogenic organisms. The clinical importance of recognising this organism lies in the fact that definitive treatment requires a long course of penicillin group antibiotics even after surgical excision.¹⁰

CASE PRESENTATION

A 10-year-old female presented to the otorhinolaryngology department with neck swelling, severe sore throat, painful deglutition, difficulty in speech and fever since 1 day. She had recurrent acute tonsillitis since 22 months, for which she was prescribed antibiotics and analgesics by

different local practitioners. The patient had a history of dental caries of right first upper molar tooth, which was extracted 2 years ago. She also had complaints of snoring with difficulty in breathing and breathing through mouth during sleep. General and systemic examinations were unremarkable. Local examination of the neck revealed a swelling in the left submandibular area. The swelling was 4×3 cm, firm in consistency and tender on palpation. Oral cavity examination revealed enlarged left tonsil with copious amounts of thick particulate material in the crypts of the left tonsil while the right tonsil was apparently normal. The patient was diagnosed as a case of acute recurrent tonsillitis with regional lymphadenitis and associated obstructive sleep apnoea. Fine needle aspiration cytology (FNAC) of neck swelling revealed reactive lymphadenitis. A throat swab culture revealed mixed infection with pathogenic and commensal microorganisms. Antistreptolysin O titre was 340 Todd units. The patient was given erythromycin 250 mg four times daily for 7 days, oxymetazoline nasal drops as required for symptomatic relief of nasal obstruction, ibuprofen, mouth washes and warm saline gargles. The patient was afforded considerable symptomatic relief by the treatment.

The patient due to repeated bouts of acute tonsillitis associated with tonsillar hypertrophy and obstructive sleep apnoea during the past 22 months underwent elective tonsillectomy and resected tissue was submitted for histopathological examination. Microscopic examination revealed hypertrophic tonsil with dense neutrophilic infiltration and bacterial colonies with sulphur granules (figures 1 and 2), which stained positive with Gram stain, periodic acid Schiff (PAS) stain (figure 3) and Gomori methamine silver (GMS) stain (figure 4) and negative with acid-fast stain, confirming the presence of actinomycosis.

The patient was put on a course of intravenous penicillin G, 5 million units per day for 1 month followed by a

Figure 1 Hypertrophied tonsil (left), outer zone of granulation tissue with central zone of necrosis, with acute inflammatory infiltrate. H&E×40.

Figure 2 High power view showing outer zone of granulation tissue surrounded by neutrophilic infiltrate and central zone of necrosis. H&E×100.

course of oral penicillin (amoxycillin 400 mg+clavulanate 57 mg), twice a day for 2 months along with oral lactobacillus. There was complete resolution of the neck swelling due to regional lymphadenitis after 1 month of treatment.

INVESTIGATIONS

At time of admission

- FNAC: reactive lymphadenitis
- Total leucocyte count: 12 000/cu mm with polymorphonuclear leukocytosis

Figure 3 Photomicrograph showing periodic acid Schiff's (PAS) positivity of actinomycetes colonies. PAS×40.

Figure 4 Photomicrograph showing Gomori methamine silver (GMS) positivity of actinomycetes colonies. GMS×40.

► Throat swab culture:

1. Pathogenic: β haemolytic streptococci
 2. Non-pathogenic: *Streptococcus salivaris*, *Streptococcus mutans*, *Streptococcus sanguis*, *Neisseria lactamica*, *Staphylococcus saprophyticus* and *Staphylococcus epidermidis*
- Antistreptolysin O titre: 340 Todd units

- Chest roentgenogram showed no abnormality.

20 Days postoperatively

- Total leucocyte count: 5000/cu mm
- Throat swab culture: negative for pathogenic organism
- Antistreptolysin O titre: 140 Todd units.

DIFFERENTIAL DIAGNOSIS

Recurrent acute tonsillitis may be due to microbial infections, foreign body or other artefacts

Nocardia is an important differential for actinomycosis infection.¹

TREATMENT

Elective tonsillectomy under antibiotic coverage, with high-dose intravenous penicillin for 1 month followed by oral penicillins for 3 months.

OUTCOME AND FOLLOW-UP

The patient was advised proper oral hygiene and after 6 months of follow-up the patient is disease free with considerable relief in snoring and no difficulty in breathing during sleep. The patient was subsequently put on prophylaxis for rheumatic fever/rheumatic heart disease with penicillin.

DISCUSSION

The commonest form of actinomycosis is cervico-facial and results from direct invasion of commensal oral actinomyces into local tissues by oromaxillofacial trauma, dental implantation and dental caries;¹ our patient gave history of dental caries.

Infections spread contiguously, crossing soft tissue and bones with formation of multiple abscess, replacing local tissue with granulation tissue with little tendency to heal and may extend to the surface forming purulent material draining sinus tracts, the classic lesion being observed in 40% cases.^{11 12} The pathogenesis is related to its ability to act as an intracellular parasite and thus resist phagocytosis as well as its tendency to spread without respect for established tissue planes or anatomic barriers.⁶

For the diagnosis of actinomycosis to be established, two of the following conditions must be present: positive cultures, sulfur granules or biopsy specimens showing the organism.⁶ The typical findings on histological examination of the tissue is diagnostic with an outer zone of granulation tissue and a central zone of necrosis containing many granules that represent microcolonies of actinomycosis.⁹

The presence of actinomycosis and its role in tonsillar hypertrophy and recurrent tonsillitis is debatable. Ozgursoy *et al* reported that although actinomycetes does not indicate active issue infection, it can cause obstructive tonsillitis.² This may give rise to obstructive sleep apnoea. Pransky *et al* found actinomycetes to be more prevalent contemplated it's aetiological role in obstructive tonsillar-adenoidal hypertrophy.³ Actinomycosis colonisation has been reported to be higher in patients undergoing tonsillectomies for sleep disordered breathing as compared to recurrent tonsillitis, but it does not contribute to tonsillar hypertrophy or to recurrent tonsillitis.^{13 14} However, other studies have found no causal association between tonsillar hypertrophy, recurrent tonsillitis and actinomycetes infection.^{4 5 15} But actinomycetes is found to be more prevalent in children over 5 years of age.⁴

The common indications for tonsillectomy are episodes of recurrent tonsillitis or tonsillar hypertrophy which can cause obstructive symptoms such as snoring and sleep apnoea. Although a patient may respond to antibiotic

treatment, tonsillectomy may be required in those patients who fail to respond to antibiotic treatment.¹⁶ However, post surgery high-dose intravenous penicillin for 4 weeks followed by 3–6 months of oral penicillin is the current recommendation, even after complete resolution of symptoms to prevent recurrence.^{6 10} Other antimicrobials that can be used are cephalosporins, tetracyclines, erythromycin and ciprofloxacin in patients allergic to penicillin.⁶

Learning points

- ▶ Actinomycosis is a normal commensal flora of the oral cavity which may become invasive whenever there is a breach in mucosa as seen with dental infections, manipulations and trauma.
- ▶ Actinomycosis is difficult to culture and the diagnostic pitfall is that the patient may be treated only for other pathogenic organisms which are more readily evident on culture.
- ▶ In cases of recurrent tonsillitis and tonsillar hypertrophy, associated with obstructive sleep apnoea, tonsillectomy is the treatment of choice and histopathological examination of resected tissue is strongly advocated.
- ▶ Histopathological examination can accurately diagnose actinomycosis, which compared to other infectious causes requires a long-term course of high-dose penicillins, even after surgery to prevent recurrence.
- ▶ The report supports the view that actinomycosis may have a causal association with recurrent acute tonsillitis and tonsillar hypertrophy leading to obstructive sleep apnoea.

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Competing interests None.

Patient consent Obtained.

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