Section: Research Paper

Post extraction foreign body reaction: An unusual case report with a brief review

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Abstract: A foreign body reaction is a response of the inflammatory process, which is typically granulomatous, to an exogenous or endogenous foreign material that the cutaneous immune system perceives as foreign. In this paper, we report a 23-year-old female patient who presented with complaints of pain and swelling in the left lower back tooth region and had a history of third molar extraction in the third quadrant. A panoramic radiograph was taken before and after the extraction, and the post-surgical radiograph displayed a non-healing lesion. Tissue was excised and sent for histopathological examination. By and large, there are substantial causes for a post-extraction foreign body reaction, and in our case, it was likely due to food cover or chewing gum paper impaction. After a thorough evaluation, prompt treatment and regular follow-up on the case were made.

Keywords: Extraction, Third molar, foreign body reaction, Granuloma.

Introduction: Exposure of the immune system to exogenous material or an endogenous substance otherwise typically protected from the immune system causes foreign body reactions. One of the most common operations performed by oral and maxillofacial surgeons is the extraction of the third molar, and the majority of these operations are carried out

without any intra- or postoperative complications. Proper instructions are given to the patients so that they can avoid any further complications. The extraction socket is a delicate area wherein the healing process happens, and the area should be maintained sterile until the healing is satisfactory. Any additional trauma or unknown impaction of food or foreign material to the extraction socket makes the healing process troublesome, possibly leading to granulation tissue reactions. Here we report a case of foreign body reaction in the extraction socket, likely due to the impaction of food material or the chewing gum cover.

Case Report: A 23-year-old female patient visited a private dental college in Mangalore, presented with the chief complaints of pain and swelling in the left lower back tooth region for one week. The patient had already undergone extraction of the lower left mandibular third molar a month back which was horizontally impacted. Post-operatively, she complained of pain and swelling in the tooth removal area. Intraoral examination revealed a non-healing socket with profuse tissue growth. A foreign body from within the extraction socket and the tissues around the extraction socket were sent for histopathological examination. Also, radiographically, the socket presented with an ill-defined radiolucency. Histopathological examination revealed a stratified squamous non-keratinized epithelium which was hyperplastic in some areas and underlying connective tissue. The connective tissue consisted of collagen fibres and fibroblasts with dense mixed inflammatory infiltrate, chiefly lymphocytes, plasma cells and multinucleated foreign body giant cells. Structureless basophilic areas (foreign body?) and Von Kossa positive calcifications were noted. A histopathological diagnosis of foreign body reaction was given and advised for a regular follow-up.

Figure 1*: Orthopantomogram of the patient before extraction showing horizontal impaction of 38.*

***Figure 2**: Orthopantomogram of the patient after extraction showing non healing extraction socket 38.*

***Figure 3:** Paper bit submitted in bottle-1 under stereomicroscope measuring 0.5cmx0.3cmx0.2cm in size.*

***Figure 4:** Gross image of the paper bit retrieved from the extraction socket which was submitted in bottle A.*

Figure 4: *Gross image of the tissue bits retrieved around the extraction socket which was submitted in bottle B.*

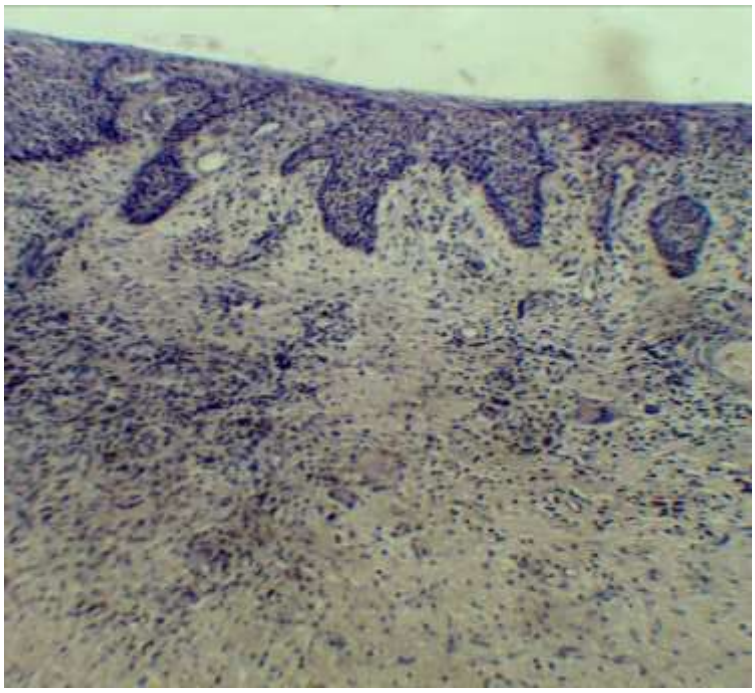


Figure 6: *H&E-stained image of the tissues surrounding the extraction socket(10x).*

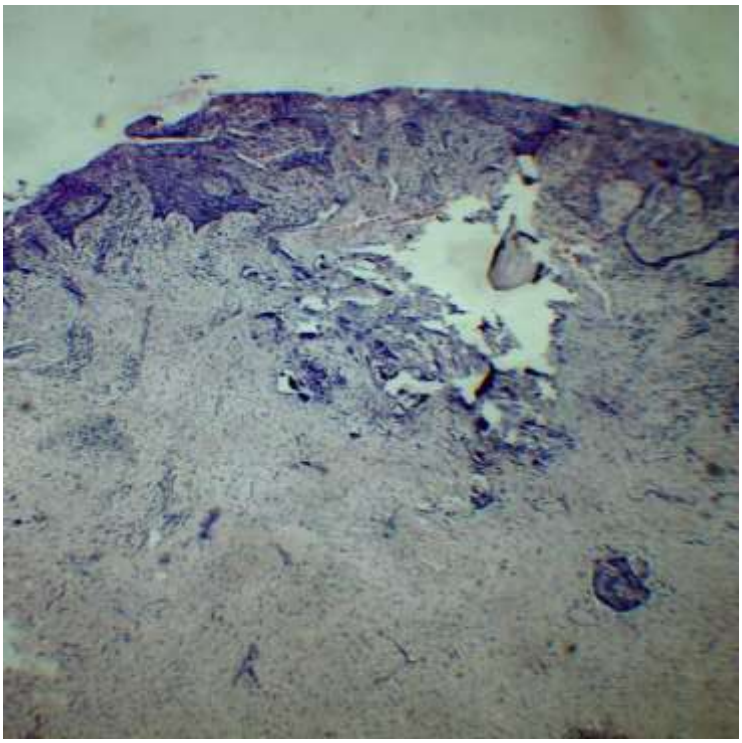


Figure 7: *H&E stained image of the tissues surrounding the extraction socket(scanner view 4x).*

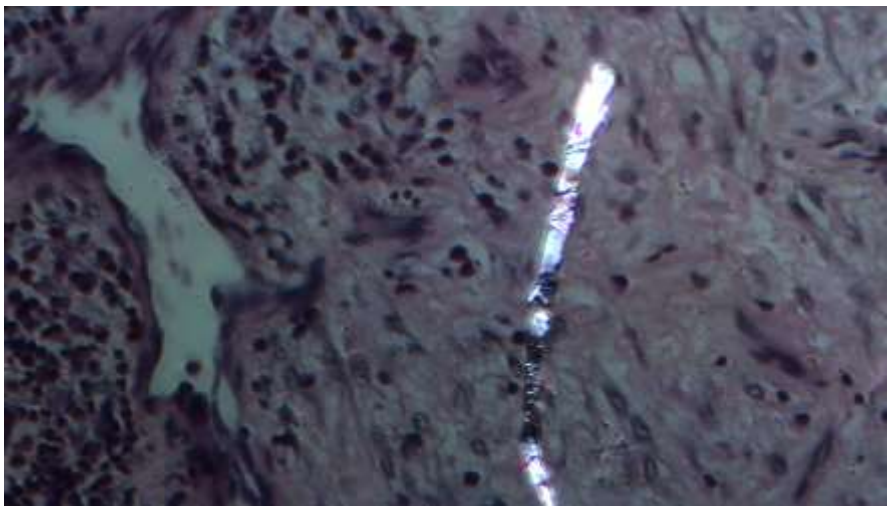


Figure 8: *H & E stained section under polarising microscope showing refractile foreign body(paper material)*

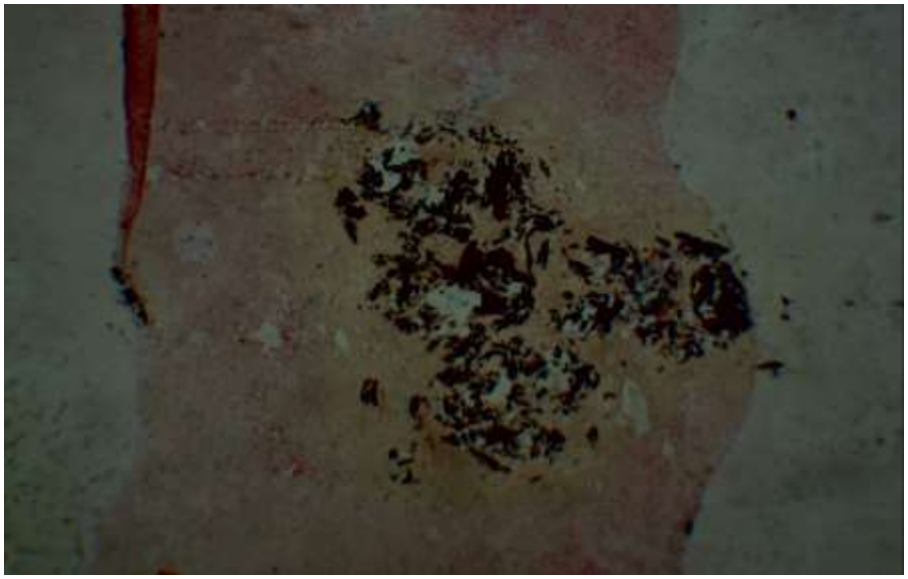


Figure 9: *Von kossa stained section showing calcifications (10x)*

Discussion: A foreign body reaction is the final stage of the immune system's inflammatory response to implanting any foreign substance [1]. The rate of foreign body occurrence in the maxillofacial region is alarmingly rising, and as of today, the maxillofacial area has a 0.3-2.8% informed incidence of foreign body [2]. Third molar extractions are common yet quite sensitive and have complications. Sometimes, as extraction sockets heal, hyperplastic growths of granulation tissue might appear. These lesions result from the socket's tissue reacting to foreign substances [3]. According to the literature, the foreign body reaction in an extraction socket following any foreign substance may include paper, food particles, lead, metals, gauze, or suture materials. In our case, the reaction was likely from the food cover paper or chewing gum paper. Traumatic or iatrogenic injury may result in the assimilation of foreign bodies, their insertion into body cavities, or their deposit into the body. Traumatic foreign bodies frequently result from physical assaults, car accidents, and gunshot wounds [4]. In the oral cavity, it is frequent to encounter these foreign things and the tissues' reactions to them. Some foreign bodies may result in septicemia, the development of abscesses, or severe haemorrhaging. Also possible is distant embolization [5]. Because of several circumstances, including the object's size, the difficulty of access, and the close anatomical proximity of the foreign body to essential tissues, foreign bodies found in the oral cavity may be difficult to diagnose [6]. Pseudoaneurysms, synovitis, and infections of peripheral nerve injury are complications brought on by impacted foreign bodies [7].In our case, the patient had swelling and a non-healing socket**.**

The most common differential diagnosis of a foreign body reaction include:

Post extraction granuloma:

Due to the presence of a foreign body inside the extracted tooth socket, this unusual complication usually manifests 4–5 days after tooth extraction. Amalgam remains, bone pieces, tiny tooth fragments, calculus, and other foreign items are frequently found. Inflammation from foreign items prevents post-extraction healing from occurring, and the wound suppuration as a result. Macrophages, lymphocytes, plasma cells, mast cells, and eosinophils are frequently seen in the material histopathologically, along with the presence of foreign objects [1].

Myospherulosis:

Myospherulosis is a rare foreign body response that can occasionally be brought on by local antibiotics administered to a surgical site in a petrolatum base.Histopathologically, it has

many cyst-like regions with a profusion of sporangia like structures that stain brown to black.These structures are extravasated erythrocytes that have undergone changes brought on by drugs and haemoglobin breakdown [3].

Pulse granuloma:

This is brought on by an immune system response to vegetable substances, especially from the cellulose component . Histopathologically, it is made up of a chronic inflammatory cell infiltrate and a cluster of large cells that resemble foreign bodies that are connected to ovoid, fibrillary, or amorphous hyaline masses [15].

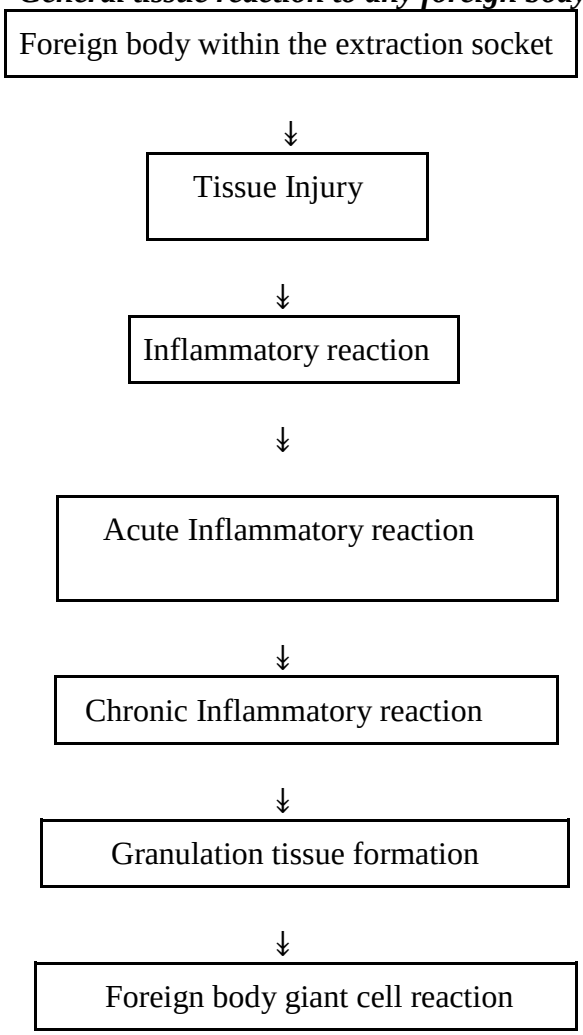
The other possible differential diagnosis are:

For a bony reaction to an unidentified organic foreign material, the possible differential diagnosis includes:

- Osteoid osteoma
- Chronic and acute osteomyelitis
- Tuberculosis granuloma
- Bone cyst
- Aneurysmal bone cyst
- Cortical fibrous defect
- Neoplasm [16].

Tissue reactions to various foreign materials:

General tissue reaction to any foreign body:



1. **Foreign body reaction to Food particles:**

Can be either endogenous or exogenous.

Implantation of plant-based food particles in filled root canals, extraction sockets [8-10].
↡
The cellulose fragments from the plants are difficult to break down.
↡
Remains in the form of thick amorphous material.
↡
Causing a persistent chronic granulomatous reaction.

Once the food enters the tissues, it is quickly absorbed and changed by the host responses[11].

2. Foreign body reaction to Biomaterials[12].

Within minutes after implantation of a biomaterial within an extraction socket:
Binding of serum proteins occurs
↡
Within hours after implantation:There will be recruitment of neutrophils to the site.
↡
Within days after implantation:There will be monocyte recruitment and differentiation to macrophages with foreign body giant cell reaction
↡
Within weeks after implantation: Fibrotic encapsulation occurs.

2. **Foreign body reaction to Suture materials[13]:**

Two types of reaction is noticed:

A. Type I:

Suture stays tightly wound
↡
A capsule of fibrous tissue of varying thickness surrounds it.
↡
Histiocytes can be found in the capsule next to the suture (typically one to three cell layers deep).

- Numbers and occurrences of giant cells vary.
- Additionally, lymphocytes come in different forms and sporadic localised accumulations.
- Capillaries may be noticeable in reactions that are more cellular.

B. Type II:

In the second type of reaction, the capsule is still visible, but fibroblasts and histiocytes have infiltrated the suture's interstices. Rarely the reaction resembles a granuloma in appearance.

4. Foreign body reaction to Gauze material [14]:
Chronic inflammatory infiltration and granuloma formation with birefringent foreign bodies mimicking gauze materials are usually found.

Conclusion:
A post-extraction foreign body reaction or a granuloma is a complication one must take seriously. On-time diagnosis of the patient can save further hurdles in anticipation. Ruling out differential diagnosis is vital in identifying the complication and understanding the histopathological reactions to various foreign materials. Thereby clear and legible postoperative information given can lead to the possibility of prompt treatment of patients avoiding post-extraction complications.

Conflicts of interest: There are no conflicts of interest.

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