Action of Ferric Sulphate on Pulpal Tissue – A Monograph

Nahan. K¹, Dr. Deepa Gurunathan²

¹Undergraduate Student, Final Year, Saveetha Dental College, Saveetha University, Chennai, India
²Professor, Department of Pedodontics, Saveetha Dental College, Saveetha University, Chennai, India

Abstract: Pulpotomy is a procedure done when coronal pulp tissue is exposed by caries in primary teeth. Many techniques have been used for the treatment of pulpally involved primary teeth. One among those include ferric sulphate (FS) medicament which is used a hemostatic agent. Studies have shown that Ferric sulphate has good clinical and radiographic results with high tooth survival rates.

Keywords: ferric sulphate, hemostatic agent, pulpotomy

1. Introduction

In pediatric dentistry, pulpotomy is a common therapy which is performed in a primary molar with extensive caries but without evidence of radicular pathology when caries removal results in a carious or mechanical pulp exposure. The pulpotomy is a procedure which involves covering the pulp stumps with a pulp-capping agent to promote healing or an agent to fix the underlying tissue [1]. Various pulpotomy agents, formaldehyde-based materials, electrosurgery, lasers, glutaraldehyde haemostatic medicaments, zinc oxide eugenol, bone morphogenic protein (BMP), collagen and calcium involving, dentin bridge inducing materials, have been used for the procedure.

Ferric sulfate or Fe₂SO₄ is one among that which is a dark brown chemical agent with acidic properties. Ferric sulfate exerts its haemostatic effect through a chemical reaction with blood proteins; this property makes ferric sulfate a very efficient haemostatic agent, without need for help from the haemostatic system to exert its effect. It adequately control bleeding even in the patients with abnormal haemostasis [2,3]. This property, with regard to the significant amount of proteins in the blood, makes ferric sulfate a very strong haemostatic agent.

2. Mechanism of Action

When ferric sulphate is applied, the blood proteins get agglutinated (4). Red blood cells which have sialated glycoproteins embedded give a negative charged surface. This negativity will create a repulsive electric zeta potential between cells (5). When agglutination force exceeds the force of repulsive force generated by the negative charge, blood gets agglutinated.

Figure 1: Hemagglutination reaction; blood group antigens and antibodies forming clumping of erythrocytes.
A reaction occurs when Ferric and sulphate ions react with the blood which forms agglutinated blood proteins. The agglutinated blood proteins form plugs which helps in sealing the damaged capillary orifices (6). The capillary which has 3-7um in diameter (7) occludes when the ferric ion protein complex seals the vessels which will prevent clot formation (8). This could be due to a chance that metal proteins clot formed at the surface of pulp stumps can act as barrier and there is a passive function as proposed by Ranly[9].

Radiographic changes can be osseous and dental. Resorption in bone, interradicular destruction, external root resorption, periapical bone destruction are the osseous resorptive changes examined. Whereas, dental changes can be due to the kind of medicament used and its pulpal response[14].

**References**