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COMPARISON OF N-2-BUTYL CYANOACRYLATE (HISTOACRYL) VERSUS MICRO-PLATES IN THE HEALING OF ZYGOMATICO-MAXILLARY COMPLEX FRACTURES (AN EXPERIMENTAL STUDY)

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INTRODUCTION

Zygomatic bone fractures are the second most frequent facial fractures after nasal fracture. Many techniques were used in the treatment of the zygomatic bone fractures [(1)].

METHODOLOGY

The aim of the study was to compare both clinical and histological healing performance of histoacryl versus conventional micro-plates in ZMC fracture in rabbits.

The study included twelve NewZealand white rabbits. Animals were divided equally into two main groups: group A (n=6) (control group); ZMC fracture was fixed with micro-plates and screws. Group B (n=6) (study group); ZMC fracture was fixed with histoacryl.

Group A **Group B**

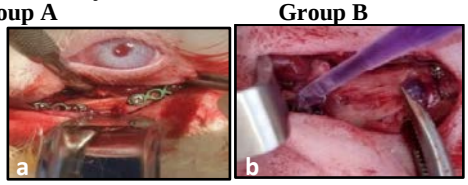

Figure 1(a,b): a: Fixation with microplate. **b:** Fixation with histoacryl.

At the end of the first and fourth weeks, three rabbits from each group were sacrificed. The treatment sites were evaluated Clinically, Histologically, and Histomorphometrically.

RESULTS AND DISSCUSSION

Clinical results showed no infection or mobility in any animals of both groups. Histological results, by the end of the first week, the histoacryl group showed less granulation tissue and mild inflammation compared to the control with woven bone formation. The microplate group showed more granulation tissue with finely woven bone spicules at the side of the fracture area. In the fourth week, the control group showed mature bone formation at the fracture site's border while the center was still full of granulation tissue.

The histoacryl group exhibited complete closure of the fracture site with mature lamellar bone. These results were confirmed by histomorphometric analysis, there was increase in the percentage of bone surface area in the histoacryl the mean was (49.55 and 65.04) in 1 and 4 weeks respectively while in control group was (46.40 and 56.40).

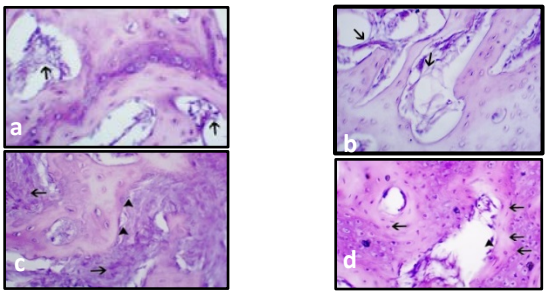

Figure 2 (a-d): a: Light micrograph (LM) (Group A, 1 week) showing woven bone. Mild granulation tissue (arrow heads) with inflammatory infiltration, **b:** LM (GP B, 1 week) showing smooth surface mature bone and granulation tissue with mild inflammatory cells (arrows), **c:** L.M (GP A, 4 week) showing mature lamellar bone (arrow heads) lining the bone surface. bone marrow filled with fibrous tissue. (arrows), **d:** L.M (GP B,4 week) showing primary osteon formation. Active osteoblasts (arrow heads) lining the bone marrow. Note the remodeling line (arrow). (H&E x400)

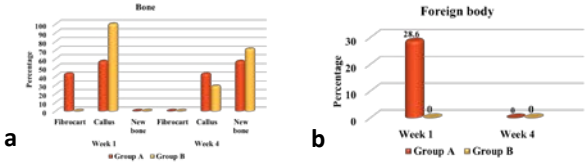

Figure 3 (a,b): a: Comparison between the two studied groups according to bone formation, **b:** Comparison between the two studied groups according to foreign body reaction.

Dadas et al. (2007)[(2)] examined the clinical effect of N2 butyl-cyanoacrylate fixation in the management of tripod zygomatic fracture, where they reported no mobility in all of the examined rabbits. Sohn et al. (2016)[(3)] compared different grades of cyanoacrylate in the bone fixation of calvarial segments in mice. They concluded that the use of long chain cyanoacrylate variants is preferred over other variants owing to its meager inflammatory response.

Heinzelmann et al. (2009)[(4)] conducted an in vitro study to determine the degree of cell toxicity in response to cyanoacrylate adhesive. Their results reported that Histoacryl is the adhesive with the highest degree of cellular vitality and least induced apoptosis, regarding it as the most biocompatible tissue adhesive

CONCLUSION

The application of histoacryl to bone defects shows easy and adequate rigid fixation to allow bone healing and maintain the original contour of the zygomatic bone comparable to the conventional micro-plates.

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