

Repairing renal injuries with cyanoacrylates

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In abdominal trauma, renal lesions are relatively common (30.3%) and in approximately 4% of the cases of renal trauma, a complete nephrectomy is necessary. The search for a fast, effective hemostatic method has led us to evaluate a new elastic cyanoacrylate in renal penetrating trauma injuries. The experiment was divided into four groups: The Control Group, Time 1 (after 48 hours of healing), Time 2 (after 6 days) and Time 3 (18 days after surgery). In the Control Group, a laparotomy was performed and closed in layers with conventional suture. In Times 1, 2 and 3, a laparotomy was carried out and a penetrating traumatic injury was created in the superior and inferior poles of each of the kidneys, making a total of four lesions per animal with a biopsy punch 0.8 cm in diameter at a depth of 3 mm. In each lesion, a different treatment was applied: One with a purified collagen sponge (Gelita-Spon[®]), another sponge with fibrinogen and thrombin (TachoSil[®]), one with the elastic cyanoacrylate adhesive, and one wound was left to heal by itself. The Control Group animals were euthanized when they reached 400 g in weight, and those from the Times 1, 2 and 3 groups at the time indicated.

After taking samples, a full histopathologic study was carried out, involving staining with hematoxylin-eosin, Masson's trichrome, Schiff (PAS) and the immunohistochemical markers CD31 (angiogenesis) and CD68 (macrophages). Measurements were also taken in microns (μm) for the distance between the edges of the lesion.

The proteomic determinations indicate that applying the cyanoacrylate with inflammatory cytokines led to an expression that corresponds to a normal inflammatory process. For the metalloproteinases, no differences were observed in the concentration of proteolytic enzymes in the lesions treated with adhesive compared to the other treatments.

The histopathology reveals that the inflammatory response observed is similar in all the treatments studied. There are no significant differences between the lesions where cyanoacrylate adhesive was applied and the other treatments as regards the distance between the edges of the lesion and the size of the area marked by CD31 and CD68.

Cyanoacrylate has proven to be a fast, efficient method for achieving hemostasis in renal penetrating injury. Furthermore, the tests have not detected differences with the other treatments used. However, one should keep in mind that it was the treatment that caused the most abdominal adhesions. Despite this, it could be a new alternative technique.

Speaker Biography

Dolores Cejalvo-Lapeña completed her PhD in Biological Sciences and currently acting as a Full prof. in Catholic University of Valencia, Spain and also act as Director of the Academic Quality Service of the Catholic University of Valencia. Her research areas include bio protecting products and therapeutic evaluation in experimental models of oxidative stress and adhesives in surgery

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