

# Accepted Manuscript

An experimental study on histopathological effects of hemostatic agents used in spinal surgery

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PII: S1878-8750(16)00297-7

DOI: [10.1016/j.wneu.2016.02.052](https://doi.org/10.1016/j.wneu.2016.02.052)

Reference: WNEU 3753

To appear in: *World Neurosurgery*

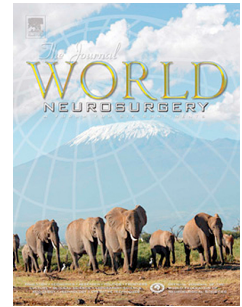
Received Date: 19 December 2015

Revised Date: 8 February 2016

Accepted Date: 9 February 2016

Please cite this article as: Altun I, An experimental study on histopathological effects of hemostatic agents used in spinal surgery, *World Neurosurgery* (2016), doi: 10.1016/j.wneu.2016.02.052.

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**Abstract**

**Purpose:** To evaluate and compare the histopathological effects of various hemostatic agents used in spinal surgery on an experimental laminectomy model in rats.

**Methods:** A total of 110 rats were randomly allocated in 11 groups including sham, control, Ankaferd hemostat<sup>®</sup> (herbal hemostatic), SeraSeal<sup>®</sup> (agar and bovine factor proteins), Floseal<sup>®</sup> (gelatin granules and thrombin), Surgiflo<sup>®</sup> (gelatin paste), Helitene<sup>®</sup> (absorbable collagen), Beriplast<sup>®</sup> (fibrin sealant containing fibrinogen, factor XIII and thrombin), Tisseel<sup>®</sup> (a fibrin sealant), Bloodcare<sup>®</sup> (hemostatic powder) and Surgicel<sup>®</sup> (oxidized cellulose polymer) categories. Hemostatic agents were applied on the epidural region after laminectomy was carried out until the identification of dura and nerve root. After a follow-up period of 12 weeks, rats were sacrificed and histological sections were performed proximal and distal to laminectomy zone. Groups were histopathologically compared in terms of chronic inflammation, fibrosis and vascularization.

**Results:** There was no difference between groups in terms of acute inflammation ( $p=0.159$ ). Chronic inflammation was more remarkable in herbal hemostatic group ( $p=0.036$ ) and there was severe fibrosis in absorbable collagen hemostatic, fibrin sealant and powder hemostatic agent groups ( $p<0.001$ ). Vascularity was more obvious in herbal hemostatic, fibrin sealant, absorbable collagen, fibrin sealant containing fibrinogen, factor XIII and thrombin, hemostatic powder and oxidized cellulose polymer groups ( $p<0.001$ ).

**Conclusion:** Hemostatic agents can cause noteworthy histopathological alterations such as inflammation, fibrosis and vascularity. In this context, flowable hemostats such as gelatine granules and thrombin or gelatin paste seem to provide more promising results in spinal surgery.

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