

WoundClot Hemostatic Dressing Efficacy for Internal Organs

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The spleen and liver are the most frequently injured organs during blunt and penetrating abdominal trauma (S. Uranus, 1996). A variety of products have been developed to be applied in the form of a hemostasis dressing that aims to stop bleeding in a severe internal injuries (A. Kamal, 2013). WoundClot, manufactured by Core Scientific Creations, is made from non-oxidized cellulose, chemically treated to transform into intermediate gel state for bleeding control and eventually to a water dissolvable product. The gel, having adhesive qualities, helps to seal the wound and achieve hemostasis.

WoundClot was applied on internal swine organs, as liver and spleen, with divers degrees of injury. The aim of the trial is to develop preliminary technique methods for optimal hemorrhage in an internal organ application. The trail was approved by the ethical committee of Asaf Harofe Medical Center.

Three Landrace crossed large white swine (female) were included in these studies. The tested swine were at hypothermic and coagulopathic state. Figure 1(A), (E) show the initial state injuries.

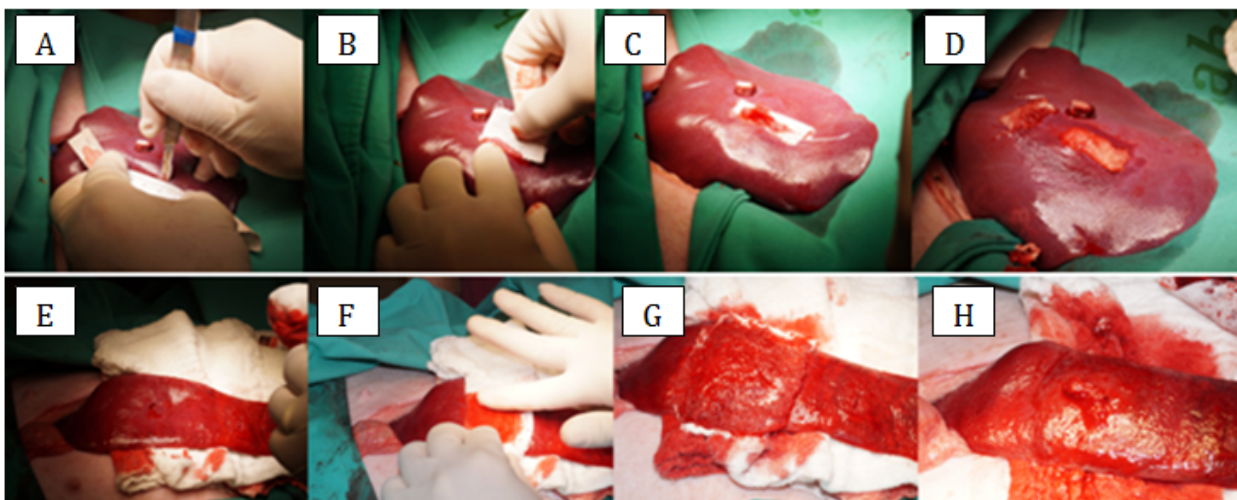


Figure 1- (A-D) Liver hemostasis test: (A) 10 mm incision cut, (B) WoundClot application on liver , (C) Initial blood adsorption , (D) WoundClot at gel state, (E-H) Spleen hemostasis test: (E) 6 mm Vascular punch, removed tissue remained in the punch device (F) WoundClot application on wound, (G) WoundClot at gel state, (H) The wound after removing the gauze.

4 different experiments were conducted: each of the tested organs was injured by a 10 mm incision cut and 6 mm vascular punch. Figure 1(A-D) shows the liver incision cut trail stages while Fig. 1(E-H) shows spleen punch injury (the complementary experiment are not presented). All injuries were treated with WoundClot gauze. These two kinds of injuries were examined in order to explore the WoundClot capabilities in different severity levels. The vascular punch injury considered to be more severe than incision cut as the later removes part of the organ tissue and homeostasis achievement is a much more challenging task.

2"×2" square samples (fig.1 (B), (F)) placed without any compression on the injured organs. The blood flow of all injuries upon gauze application was significantly reduced till bleeding had completely stopped. At the incision type of injure the bleeding stopped immediately (less then a minute), while bleeding from the punch circular wound decayed till complete stop after c.a. 4 minutes. Hemostasis achievement is due to the unique properties of WoundClot to absorb extensive amount of blood and to transform into a strong adhesive gel that seals the wound and promote coagulation by activating blood clotting factors.

When hemostasis achieved the tested organs were flexed and stretched to simulate a real

life situation, i.e. patient treatment and evacuation. Blood flow did not renewed at all cases.

These studies showed successful and immediate hemostasis of spleen and liver bleeding trauma using WoundClot product with non-compression application.

References

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