

# Pharmacological Alternatives: Topical Hemostatic Options

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The impact of surgery has multiple effects on a patient's ability to achieve normal coagulation. While there are several pharmacologic choices that can be employed to help re-establish normal hemostasis, topical hemostatic agents (THAs) are an option that can be used directly on the surgical field.

THAs can be divided into multiple categories, each with pros and cons and specific properties that make them most effective in appropriate bleeding situations. These categories include passive versus active, stand-alone versus combination agents, fibrin sealants, fibrin patches, synthetic sealants, as well as glues or adhesives.

A straightforward and simple way to understand clot formation is to divide it into primary and secondary hemostasis. Primary hemostasis occurs when there is a quick formation of a platelet plug along with factor VIII and vFW to achieve at least a temporary plug of a bleeding hole. Following this, secondary hemostasis occurs that helps for a more stable, insoluble clot using fibrin, which prevents the initial platelet plug from dissolving. This requires the well-known "clotting cascade."

As mentioned above, THAs can be categorized as passive or active. Passive agents require an intact clotting cascade as they basically form a lattice for platelets to adhere to while secondary hemostasis stabilizes the clot.

Active agents have components such as thrombin and/or fibrin which bypass the cascade and are useful in patients who have impaired coagulation. Some of these agents are combined with a passive agent that provide additional scaffolding for help with primary hemostasis. They can also come in a patch like application.

A completely different type of THA are surgical sealants that may use polyethylene glycols, serum albumin, and products such as chitosan and glutaraldehyde. These are mostly used as sealants and not necessarily as adjuncts to the body's clotting mechanisms.

It is important to understand how each of these agents work, in what situation they are most effective, what properties they each have that may influence their use (such as swelling, interactions, etc.), as well as take into account their costs, ease of application, and availability. Use of a verifiable bleeding scale, such as the VIBe scale may be helpful in accurate assessment of types and severity of bleeding.

In conclusion, when considering the use of THAs, it is imperative that the right agent is utilized in the right setting at the right time to achieve optimal hemostasis.

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