

Heat-Stable Sublingual Oxytocin for the Prevention and Treatment of Postpartum Hemorrhage

Health need

Postpartum hemorrhage (PPH) is the most significant contributor to maternal mortality and morbidity worldwide. The World Health Organization recommends injectable oxytocin for treatment of PPH. As the recommended first-line medicine for prevention and treatment of PPH, oxytocin has limited use in resource-poor areas of the world mainly due to the lack of health workers with skills necessary for parenteral administration and the need for temperature-controlled storage to maintain the drug's stability. The safety challenges posed by use of needles are further complicated by the poor temperature stability of oxytocin; it is inactivated if exposed to high ambient temperatures. Thus, health workers must be trained on safe injection as well as proper cold storage and distribution practices to ensure effective and safe delivery of oxytocin.

Technology solution

Presentation of heat-stable oxytocin in a fast-dissolving tablet (FDT) form could potentially increase the reach and efficacy of this lifesaving medication to areas lacking access to skilled health workers, refrigeration, or safe injection equipment. In addition, oxytocin in FDTs can be filled in compact blister packaging to simplify shipping, storage, and transport logistics. This approach could improve efficacy and efficiency of PPH prevention and treatment.

PATH has developed an oxytocin sublingual FDT presentation that dissolves in less than 10 seconds in the patient's mouth without the need for additional water or diluent. Sublingual tissue is highly permeable and rich in blood supply, which presents an ideal physiological medium for allowing medication to rapidly dissolve and absorb through the mucous membrane directly into the bloodstream. PATH's FDT facilitates rapid absorption into the blood stream by the highly vascularized sublingual tissue that is required to trigger quick onset of uterine contractions needed to control PPH.

Current status and results

PATH and our technical collaborators have demonstrated the feasibility of the sublingual route in delivering oxytocin in plasma rapidly within 10 minutes in a rabbit model. In addition, this FDT presentation of oxytocin is thermotolerant and is able to withstand temperature of 40°C for several months. This has been demonstrated at PATH by conducting a short-term stability study on the heat-stable FDT sealed in a blister pack where less than 5 percent loss in oxytocin potency was observed at the end of six months. Additional animal studies are planned to assess the plasma levels of oxytocin obtained via the sublingual route compared with the current intramuscular route of administration and also to test the effectiveness of sublingually delivered oxytocin in inducing contractions of the uterus as needed for prevention of bleeding during PPH.



PATH/Patrick McKern

Heat-stable oxytocin in a fast-dissolving tablet.

Oxytocin in a heat-stable, needle-free tablet format has the potential to remove barriers to lifesaving care.

Availability

For more information regarding this project, contact Manjari Lal at mlal@path.org.

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