How to: Manage acute blood loss

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Main principles for acute blood loss
• Control haemorrhage if possible.
• If uncontrolled haemorrhage, give 2–3 ml/kg bwt/h of polyionic balanced crystalloid fluids.
• Blood transfusion, especially if haematoctrit falls below 20%.
• Tranexamic acid 20 mg/kg bwt i.v., i.m. or subcut. q. 12 h.
• Consider terlipressin, 0.01–0.02 mg/kg bwt i.v. q. 4–6 h.
• Consider Yunnan Baiyao 8 mg/kg bwt per os q. 6 h.

Acute blood loss
Acute blood loss is a fairly uncommon but serious condition in horses. In breeding areas vets will most frequently come across this during parturition accidents in the mare, especially haemorrhage into the broad ligament. Trauma, erosion of blood vessels by mycotic plaques and tumours and idiopathic renal haematuria in Arabian horses are other potential causes of acute blood loss.

Control haemorrhage
Controlling the haemorrhage is a principal aim of managing acute blood loss. Compresion bandages, tourniquets and surgical repair are all priorities when possible to stem the bleeding. There are several different topical preparations that have been shown to accelerate clotting. However, many of these have been shown to have side effects such as local burning or local tissue damage. The US Army currently use a kaolin based product, where the kaolin is attached to a gauze bandage. Kaolin activates factor XII and therefore the clotting cascade. There are no published studies of its use in horses. Another possible topical treatment is Yunnan Baiyao (sometimes written as Yunnan Piaoyo), a Chinese herbal medicine, consisting of Pseudoginseng and 7 other plant derived ingredients. Topical Yunnan Baiyao, used in addition to packed red blood cells and platelet transfusions, topical thrombin, and oral aminocaproic acid, was found to improve control of bleeding episodes in adolescent humans with advanced cancer (Ladas et al. 2012). There are only anecdotal reports of its use in horses.

When the site of bleeding is inaccessible, such as broad ligament haemorrhage, parenteral medications are often given to try to reduce the bleeding. The best evidence surrounds tranexamic acid, which in human medicine has been shown to reduce the risk of death in bleeding trauma patients (Shakur et al. 2010), to reduce blood loss during emergency surgery (Perel et al. 2013), orthopaedic surgeries and sinus surgery. Unfortunately, there is currently little objective evidence regarding the use of tranexamic acid in horses. The recommended dose range for tranexamic acid in the horse is fairly large (5–25 mg/kg bwt i.v., i.m. or subcut. every 12 h). I currently use a dose of 20 mg/kg bwt, repeated at 12 h intervals if necessary.

Terlipressin is a vasopressor that is potentially interesting as a drug for uncontrolled haemorrhage in horses. In humans, terlipressin has been shown to reduce mortality and bleeding in patients with oesophageal variceal haemorrhage (Ioannou et al. 2003). Current experimental studies are aimed at the proposed combined therapy for uncontrolled haemorrhage of minimal intravenous fluids together with terlipressin (Devlin et al. 2013). The dose rate for terlipressin, extrapolated from human medicine, is 0.01–0.02 mg/kg bwt i.v. q. 4–6 h. However no objective data exists to support this dose in the horse.

Yunnan Baiyao has been used systemically to reduce bleeding during surgery in humans. A prospective, randomised, double-blind, placebo-controlled study evaluated 0.5 g Yunnan Baiyao by mouth 4 times daily for 3 days prior to corrective jaw surgery. The estimated blood loss was 204 ml in 44 control patients and 155 ml in 43 treated patients (Tang et al. 2009). Yunnan Baiyao has been used anecdotally in bleeding horses, especially mares with broad ligament haemorrhage but no published reports of its use could be found.

Intravenous formalin has historically been used to control bleeding in horses (Doyle et al. 2003) but there is no scientific basis for its use (Taylor et al. 2000).

Replace losses
Both giving excessive intravenous fluid and giving no intravenous fluid result in worse outcomes during uncontrolled haemorrhage than giving small amounts of fluid (Burris et al. 1999; Soucy et al. 1999). Horses should be given 2–3 ml/kg bwt/h of i.v. fluids or receive fluids titrated to maintain a mean arterial blood pressure of 60 mmHg. Once the haemorrhage is controlled, hypovolaemia should be reversed.

Whole blood transfusion also has a place during both uncontrolled and controlled haemorrhage, if blood is available. Ideally blood should be cross-matched prior to administration but in the emergency setting it is acceptable to give a single transfusion of unmatched blood (Hata and Sonoda 1974).

References
Charter 2 & 3
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