Blood transfusion in cattle

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Introduction

A procedure traditionally thought a rarity in New Zealand dairy veterinary practice, has become second-nature and an almost daily occurrence for some North Island veterinarians. From the beginning of the Theileriosis outbreak in the Waikato, the fundamental supportive therapy for affected cows has been a blood transfusion. Because of this and the rapid escalation and dissemination of clinical cases, multiple methods of blood transfusion have been tried and tested in a variety of circumstances. This summary presents a method that is both efficient and professional; it is up to the novice transfuser to select and adapt options depending on location and tool availability.

Indications for blood transfusions

- Cow with severe anaemia (<10% PCV). These cases are likely to die regardless of other treatments.
- Cow with moderate anaemia (10-15% PCV). A transfusion is recommended to aid in recovery.

Selecting a donor

- Young (ideally four-to-five years of age).
- Healthy
- As far from calving as possible (that is, dry and more than a month pre-calving or in milk and a month post-calving).
- Large (Friesian vs Jersey).
- Body Condition Score greater than 4.5.
- A quiet cow makes the job a lot easier but sedation may still be required (be aware of effects of α-2 agonists in pregnant animals).

It is recommended to perform a Packed Cell Volume (PCV) on the donor cow if possible before taking blood as PCV’s can drop as low as 15% before clinical signs are seen.

Collection of blood

Place the donor in a headbail and restrain tightly with a rope halter. Pulling the head as far as possible to either side will help expose the jugular vein. There is the option to use a small amount of sedation (20-25mg Xylazine intravenously) if restraint is poor.

Identify the jugular, then clip an exposed section of skin mid-way along the jugular groove and perform a basic sterile prep of the area. Inject a 2-5ml subcutaneous bleb of local anaesthetic under the skin directly over the site of the previously identified jugular. Use a scalpel to make a small incision (2-3cm long) through this bleb perpendicular to the jugular groove; you should be able to feel the jugular as a distinct tube under your finger.
Dissolve the anti-coagulant sodium citrate into sterile saline as a 3.8% solution (Soldan) 38g sodium citrate into 1L Hartmanns. Dispense 100ml of this solution per 1L of blood to be collected into your collection chamber (bucket, blood collection bag, infusion pump, etc.) it should equate to about 400-500ml. If you are using a collection tube then it is advised to prime this with the anti-coagulant solution.

With the collection chamber beside you, hold off the jugular and insert - the 8-12ga needle +/- primed collection tube, directed away from the heart, until you obtain a fast-flowing stream of blood. Begin collecting into the chamber - a total of 4-5L should take about five minutes. Continuously agitate the collection chamber to ensure distribution of the anti-coagulant.

Once you have obtained the desired quantity, release the jugular and remove the needle. Apply pressure for a few minutes, or until clotted. Option is to stitch the skin incision but experience indicates no post-procedure issues with leaving them to heal via second intention.

**Administration of blood**

Depending on the situation and reason for your blood transfusion, supplementary medications such as Ketol, Antimine (10-12ml intramuscularly), Hemo15 (10-20ml) or a suitable prophylactic antibiotic course may be given prior to transfusion at the veterinarians’ discretion. If giving buparvaquaone, ensure all applicable paperwork is filled out, the correct ear tags are placed and the owner is aware of the withhold periods and their obligations relating to the future of these animals.

Place the recipient into a headbail and restrain tightly with a rope halter. If necessary, transfusion can be done in a paddock to a down cow restrained with a halter tied to her leg. Identify the jugular, then clip an exposed section of skin mid-way along the jugular groove and perform a basic sterile prep of the area. Seat the 12-14 gauge needle securely in the jugular facing towards the heart. Prime the pump, taking care not to over-pressurise. Let blood run through the giving set, then attach the set to the needle.

It is recommended to run the blood in relatively slowly for the first few minutes: while there is a low risk of transfusion reactions (manifested as respiratory distress, oedematous swellings, tachycardia, hiccupping, thrashing or sweating), the recipient should be continuously monitored. In case of reactions, give adrenalin (epinephrine) at a dose of 1-5ml intravenously or 4-8ml intramuscularly/subcutaneously of a 1mg/ml solution.

The remainder of the blood can be run in over five to ten minutes. Monitor the giving set for any air pockets towards the end of the transfusion and stop once you see these begin to appear, even if your collection chamber is not yet empty. Subsequently, remove the needle and apply pressure for a few minutes. If there are no concurrent diseases or conditions, she should look noticeably brighter within an hour after transfusion.

Rinse the giving set and container thoroughly with very dilute antiseptic solution, and air dry. Restock your transfusion kit.

**Summary**

It is a good idea to familiarise yourself with a transfusion kit if your clinic is located in an at-risk area. Ensuring your transfusion kit is well stocked and well organised, including laminated step-by-step instructions will ensure a streamlined procedure. If possible, get an assistant (Vet Tech) out to help you. Remember, practice makes perfect!

**References**


Lawrence K. Theileria orientalis (Ikeda) associated bovine anaemia: The epidemic to date. Vetscript 26, 12–13, 2013


