SAVC GUIDELINES FOR CANINE AND FELINE BLOOD BANKING PRACTICE

The term “blood bank” implies a stock of blood product which has been collected by a practice / vet for the purpose of transfusing into another patient. Animals may be required to donate blood on a routine basis or only on an emergency basis – depending on how the practice prefers. The blood collected may be used only for in house purposes or may be sold to other practices which require blood on an ad hoc emergency basis.

If the practice / vet is collecting the blood it is his/her responsibility to ensure that correct technique and guidelines are followed. Even if the vet has just purchased the blood from a “blood bank” it is his/her responsibility to ensure that the product is correctly handled and stored.

The donor criteria listed here are applicable to animals identified / selected as regular practice blood donors.

CANINE:

Introduction:
- Dogs do not have natural antibodies to other blood types (allo-antibodies)
- There are 7 different dog blood types: DEA 1.1/1.2 /1.3, 3, 4, 5, and 7.
  - Dogs can have any combination of antigens
  - DEA 1.2/1.2 and 1.3 are alleles: i.e. only one can be expressed in an individual
- DEA 1.1 and 1.2, although less so, is the only blood antibody which will induce a severe haemolytic transfusion reaction (it is a haemagglutinin). The remaining blood types will induce a low grade extra-vascular haemolysis.
- The first incompatible transfusion will not be problematic but will sensitize the patient to further transfusions with that blood type.
- Approximately 47% of the general canine population is DEA 1.1 negative.
- Definite breed differences are present in SA and probably worldwide:

Donor Requirements:
- Donor dogs should be > 25kg and fully grown before they donate
- Calm temperament to facilitate easy bleeding and decrease the need of sedation
- Dogs can donate 1 unit (425 ml) for every 20-25 kg in body weight
- Intervals of 4-6 weeks are acceptable.
  - On a good diet even intervals of 2 weeks show no long term detrimental effects (Iron loss anaemia).
- Animals which have had a previous blood transfusion cannot donate blood.
- Breeding bitches can donate blood if not pregnant
- All donors must receive appropriate ectoparacidal treatment.
The DEA 1.1 status of the donor animal should be known:

- When an identified group of animals is routinely used as blood donors in a practice there is no reason why they cannot be typed.
  - The cost of the test can be easily absorbed in the price of the blood over about 4 collections.
  - Repeat transfusions may increase the risk of incompatible transfusions if the same donors are used.
  - It is good practice.

- If Untyped blood is transfused, the first transfusion is safe but may sensitize a DEA1.1 negative recipient to future transfusions if donor is DEA1.1 positive. The risk of sensitisation is 25% and of a second incompatible transfusion is 13%.
- DEA1.1 negative blood is the ideal "universal" product all for practical purposes as should not sensitize any recipient to a blood antigen.
- DEA1.1 positive blood will sensitize DEA1.1 negative recipient. It would be necessary to type recipients if using this blood. The plasma can be safely utilised though.

**Donor testing:**
- A peripheral blood smear and PCV must always be performed prior to collection to ensure that the patient is fit to donate.
  - If the Ht/PCV < 45 - do not collect
- Full screening for blood parasites should be performed prior to inclusion in a donor program.
  - A blood smear differential count / haematology is the minimum requirement
  - If in an endemic region - IFA Titres > 1:80 = true positive for *E canis*, if <1:80 repeat test in 3 weeks or do PCR. The point of care snap test screens at 1:100.
  - Testing for *Bartonella* spp is not yet recommended routinely

**Collection procedure:**
- Sedation can be administered but should not drop the blood pressure as this slows the collection process and may lead to clotting of the blood.
- The jugular vein is the site of collection
  - Mid-jugular is easiest
- Site preparation should be surgical and a high standard of asepsis must be maintained during collection to prevent contamination of the product.
  - Clip (fresh /dedicated clipper blade to prevent rash)
  - Wash with hibitane/disinfectant soap and water
  - Dry
  - Wipe with alcohol
- Hands should be well washed with hibitane/disinfectant soap. If collector is not experienced – sterile surgical gloves should be worn.
- Blood can be collected using gravity or a light vacuum.
- Blood must be collected in the appropriate collecting bags according to the product required.
- It is preferable to use collecting bags that contain an anticoagulant (citrate) as well as a preservative, as this prolongs the shelf life of the product.
  - Alternative anticoagulants:
    - i. 625 U heparin in / 50 ml for immediate transfusion
    - ii. 3.8% sodium citrate: 1ml / 9ml blood for immediate transfusion
    - iii. CPDA-1 : 1ml/7ml blood
- The units must be properly sealed, dated and labelled with donor and blood type.
  - Sealer clips are available from the suppliers of the blood collection bags
  - Alternatively the collection line can be double knotted.

**Storage of blood**
The proper storage of the blood is vital to maintaining its quality. Blood is still metabolically active. The citrate has only inhibited the coagulation cascade. Blood which is to be processed must be collected in appropriate collection bags and must be fully processed to fresh frozen plasma within 6 hrs of collection.

Whole blood and Packed red blood cells
- Whole blood and packed red blood cells are stored in a fridge at 4-7°C.
  - A dedicated or less used fridge is preferable to prevent loss of cool air.
  - Whole blood should last 4 weeks and PRBC should last 6 weeks after collection.
  - Sedimentation of the cells occurs if the bags aren't constantly mixed - daily mixing / turning of the units will prolong the lifespan. This applies to packed red blood cells (PRBC) as well as whole blood.
    - Dark blood will need to be discarded. The units often deteriorate prior to the expiry date if not regularly mixed. The preservative, which contains phosphate and dextrose, needs to be mixed in with the blood to be effective.
  - Carbon dioxide needs to be able to diffuse through the plastic of the bag. It is thus not ideal to pack the blood bags on top of each other or into plastic containers.

Plasma
- Plasma products are stored at -20°C or -70°C
- Fresh frozen plasma is determined as plasma frozen within 8 hrs after collection and stored for less than 1 year.
- Frozen plasma can be stored for up to 5 years.

Welfare dog versus Pet dog collection
Collection / harvesting of blood from a welfare animal which is to be euthanased is no different from that from a pet animal.

In the welfare animal:
- Only clinically healthy animals will be used:
  - No patients with oculo-nasal discharges and obvious wounds or infections should be selected
- A blood smear must be performed and not show any of the following which may indicate Ehrlichiosis or babesiosis
  - Blood-parasites
  - Thrombocytopenia
  - Monocytosis
- Sedation is performed using a light GA (intraval / propofol)
- Collection of blood is from the jugular vein as described above
- Collection of multiple units will occur until blood pressure is too low
- The donor will then be Euthanased.
- Blood typing is often not performed in these situations due to cost constraints. If multiple units are collected the cost per unit is obviously decreased.
FELINE

Feline blood banking is defined as the use of identified cats as donors within a practice – these may be practice cats, client owned cats or staff pets. The donor criteria listed are applicable to patient’s identified as “practice” donors.

Introduction

Cats have natural antibodies to other blood types and can exhibit a transfusion reaction on the first transfusion. Cat blood types are A, B and AB.

Donor

- Cats weighing over 5 kg are preferred (lean body weight).
- Cats kept indoors / yard restricted are preferred due to the viral diseases.

Donor testing:

- Cat must be tested to be free of FeLV and FIV.
- Blood smear to exclude parasitaemia – Babesia felis or Mycoplasma haemofelis: both of which can develop into a carrier status.
  - Cats with blood smear evidence or PCR positive results must be excluded as a donor.
- Bartonellosis is not routinely tested for.
- All cats should be typed - donor and recipient.
  - If blood typing is not possible - in emergency situation:
    - In general DSH cats are > 97% likely to be type A
    - Oriental breeds 100% type A  
      - In this situation an untyped transfusion is reasonably safe.
    - Persians, British shorthairs, Exotics, Devon and Cornish Rex and Sphynx cats have from 25-50% individuals testing Type B.
      - In this situation typing/ crossmatching is strongly recommended to prevent transfusion reactions.

- All donors must receive routine ectoparasiticidal treatment

Collection

- Ht / PCV and peripheral blood smear should be performed prior to collection, especially in areas where feline babesiosis occurs.
- Cats have a smaller circulatory volume and only 11 ml / kg should be collected.
  - Some cats may require volume replacement with Ringers lactate or saline.
- Cats are more likely to need sedation prior to collection.
  - A 0.2 ml medetomidine combined with 0.2 ml ketamine works without dropping the blood pressure too much.
  - Another alternative is 10 mg Ketamine and 0.5 mg diazepam i.v.
- The jugular vein is used.
  - Surgical preparation as with the dog (wash and alcohol wipe)
  - A needle, jelco or butterfly to collect from the jugular vein.
  - Because we only collect when we have a case requiring a transfusion we keep the blood in the 20 ml syringe and transfuse directly.
- Each 20 ml syringe is primed with 2.5 -3 ml citrate (1 ml citrate to about 7-9 ml blood).
  - Alternative anticoagulant is 625 U heparin in / 50 ml for immediate transfusion. Citrate is preferred to heparin, which might cause a coagulopathy in the recipient.
- Because the collection system is classified as “open” blood can only be stored for 2 weeks. In general blood is only collected on an emergency basis in cats and is not
separated into plasma and packed cells. Most cats needing packed red cells will benefit from the plasma as well.

References: