

Feline blood transfusions

practical guidelines for vet nurses

This 'Practice Pointers' article from the ISFM presents a summary of considerations for the veterinary nurse regarding potential feline blood donors and recipients. It is complemented by practical guidelines for vets, and an information sheet for owners on offering their cat as a blood donor. Together the series is intended to improve the practice of blood transfusions and, in turn, the welfare of the cats involved.

The veterinary nurse has an important role to play in feline blood transfusions, both for the recipient cat and the donor cat, and in communicating information to both sets of owners.

The potential recipient

As there is a potential risk to the donor cat associated with blood collection (see overleaf), it is important that this is carefully weighed up against the potential gain for the recipient cat.

In all cases it needs to be ascertained that a blood transfusion is definitely the most appropriate treatment.

Not every anaemic cat will need a blood transfusion and so it is important that the cat's condition is fully assessed and every treatment option is considered. If the cat's anaemia is regenerative it may be that supportive treatment is adequate for a short period of time while the cat replaces its own red blood cells (RBCs). Blood substitutes such as Oxyglobin (OPK Biotech) may also be appropriate. The impact of diagnostic investigations, and the cause of the anaemia, need to be considered too; in a cat with a terminal illness (eg, neoplasia, FeLV) the potential benefit of a blood transfusion may not outweigh the risk to the donor.

The potential gain to the recipient cat must outweigh the risk to the donor.



Blood typing – why so essential?

Blood types

Cats have three blood types: A, B or AB. In contrast to dogs and people they have naturally occurring antibodies against the other blood type. This means that, even with a first transfusion, a transfusion reaction would occur if a cat is administered the wrong blood type. If type B cats are given type A blood this reaction can be fatal. It is, therefore, essential that all feline donors, as well as recipients, are blood typed prior to collecting blood.

Type A is the most common blood type in domestic shorthair cats. However, recently, type B has been identified as being more common in domestic shorthair cats than was initially believed. Some particular pedigree breeds have a higher prevalence of type B (see the veterinary guidelines for further information).

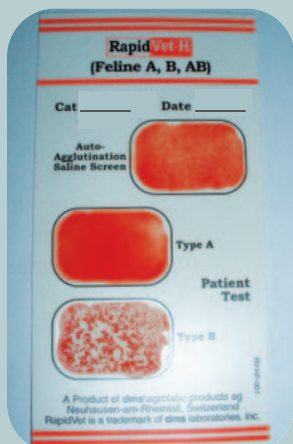
Blood typing methods

In-house blood typing kits are available, allowing immediate results. They are quick and simple to use, and relatively cheap. Examples include:

- In-house cards (Rapid Vet-H) (www.rapidvet.com)
- Strip test (Feline Quick Test A+B) (www.alvediavet.com/products_new.php)

Other methods of blood typing, and instructions on how to perform cross-matching, are included in the veterinary guidelines.

Incompatible blood transfusion reactions can be fatal in type B cats given type A blood, as the recipient's anti-A alloantibodies rapidly haemolyse the donor type A RBCs. In type A cats given type B blood, the transfusion reaction is unlikely to be fatal, but the transfused cells will be extremely short-lived.



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The potential donor

Obtaining consent for blood donation

Informed consent should always be obtained from the owner before using their cat for blood donation. Obviously, unlike humans, a blood donor cat cannot give consent itself – the owners need to give consent on its behalf. It is, therefore, very important that owners fully understand the risks of the procedure; especially so in cats because there is a higher risk involved in donating blood, compared with people or dogs. This is mainly due to their small size and, therefore, the relatively larger proportion of their total blood volume that is collected, together with the fact that cats usually need to be sedated for blood collection. It is also not uncommon for cats to have occult diseases (ie, disease not evident on routine health checks) which may worsen following blood donation.

The owner information sheet can be used as a guide for discussing the procedure and associated risks with the owner.

Is the potential donor suitable?

Any cat used for blood donation should:

- Be healthy (indoor, fully vaccinated cats are ideal) and clinically well;
- Be large (>4 kg) and non-obese;
- Be aged 1 to 8 years (ideally 1 to 5 years);
- Have a calm temperament.

In addition, a number of practical assessments need to be satisfied:

- Comprehensive clinical examinations should be carried out, and a complete donor history obtained, with no findings of concern;
- Haematology and biochemistry should be checked and confirmed to be normal;
- The cat should have been recently screened, and found to be negative, for bloodborne infectious diseases (FeLV, FIV *Haemoplasma*, ± *Bartonella*);
- The packed cell volume (PCV) of the donor should be determined before each donation and be ≥35%;
- It is also preferable to check the donor's blood pressure before each donation to ensure this is normal (120–180 mmHg);
- Echocardiography should ideally be performed prior to donation, to assess for occult heart disease;
- Blood type compatibility – both recipient and donor must be blood typed.

What are the risks for a blood donor?

- **Hypotension (low blood pressure)** Results from removal of a large volume of blood, but may also be exacerbated by sedation. Occult heart disease is quite common in cats, and, if present, severe hypotension may develop.
- **Exacerbation of occult disease** Particularly important are heart disease (as above) and renal disease. Renal failure can be exacerbated by hypotension.

What can be done to minimise the risks?

- Ensure the cat is suitable as a blood donor (see text)
- Ensure the cat is healthy (see text)
- Take every precaution during and after the procedure:
 - The donor cat should have been starved for at least 4–5 hours before sedation
 - Double check all pre-donation checks have been performed
 - Choose sedative agents that have a minimal effect on blood pressure (see veterinary guidelines)
 - Immediately after blood collection rapidly administer intravenous fluids (see text)
 - Keep the cat warm and monitor it closely after donation

Preparing for blood collection

- Make sure the required equipment and other essentials are to hand.
- Flush through the syringes, needle, T-port and three-way tap with anticoagulant, and add 1–1.5 ml anticoagulant to each 10 ml syringe, or 3 ml to each 20 ml syringe. Although not ideal, heparin can be used as an anticoagulant if CPDA/ACD is not available; add 125 units per 10 ml of blood (blood must be used immediately if heparinised).
- Place an intravenous catheter in the donor and recipient cats.
- Set up intravenous fluids with normal saline or lactated Ringer's solution for the donor.

The maximum volume of blood that is safe to remove from a donor cat is approximately 10–12 ml/kg (ie, approximately 50 ml from a 4–5 kg cat)

Type B donors

Type B blood donors can be difficult to find due to the relative rarity of type B cats, so alternatives to blood may need to be considered if the potential recipient is type B, or you may need to be prepared to blood type a number of potential donors to try to identify a type B.

Equipment and other essentials for blood collection

- Sedative drugs (usually ketamine and midazolam)
- Anticoagulant: citrate phosphate dextrose acid (CPDA) or acid citrate dextrose (ACD) from human blood collection bags is preferred
- Syringes: 5–6 x 10 ml or 3 x 20 ml
- 21G needle and T-port or 19G butterfly needle (have spares ready too)
- Three-way tap
- Small (100 ml) blood collection bag if available (or human blood collection bag emptied of anticoagulant), with exit tubing tied off/blocked
- 19G needle for transferring blood into collection bag, or a Hemonate filter and syringe driver to administer the blood directly from the syringe
- Intravenous catheter equipment for donor and recipient
- Clippers (preferably quiet ones)
- Surgical scrub for aseptically preparing the area over both jugulars



Ideally three pairs of hands are required for blood collection. One person to restrain the cat, one person to collect the blood and the third person to continually invert each syringe as soon as it has been filled, to prevent clotting.

Practical tips for collecting blood from the donor

- Make sure you schedule enough time for the collection process; it can easily take 30 minutes and any rushing/ changing over of personnel is when things tend to go wrong.
- It is important to ensure that the donor cat is as calm and relaxed as possible. Ensure that it is housed in a quiet and comfortable area until you are ready for blood collection.
- Blood collection should be performed in a quiet room where you can ensure that there will not be any interruptions or noise during the procedure.
- Don't sedate the donor until you have everything ready that you need.
- Once the sedative drug(s) have been administered, cover the cage and leave the cat in a quiet dark room, making sure that you allow enough time for the sedation to take full effect. The cat must be closely observed during this period to ensure no problems occur during sedation.
- Place a thick comfortable bed on the table to lie the donor on.
- Blood collection is most easily done with the patient restrained upside down towards the end of the table. Not much restraint should be required if the patient is adequately sedated.
- Clip and scrub the area over the jugular veins.
- The handler will need to hold the cat's front legs and raise the vein at the base of the neck, while the bleeder holds the head.
- The procedure needs to be performed as aseptically as possible.

Administration of blood to the recipient

- A filtered giving set should be attached to the blood collection bag, or an in-line Hemonate filter (Utah Medical Products) can be used to administer the blood direct from the syringes.
- Blood is transfused at an initial rate of 0.5 ml/kg/hour over the first 5–15 minutes, while the recipient is closely observed for adverse transfusion reactions (see veterinary guidelines for further discussion). The cat's pulse and respiratory rate should be monitored during this time.
- The rate of administration will then be altered depending on the individual circumstances. In all cases, however, the full transfusion must be completed within 4 hours of blood collection to reduce the risk of bacteraemia. Monitoring for adverse reactions needs to be continued, while also monitoring for signs of volume overload.



- As soon as each syringe is filled, ensure it is continually inverted to prevent clotting; this is where a third pair of hands is very helpful.
- Once the syringes have all been filled, if a collection bag is being used, slowly transfer the blood via a 19G needle.

Aftercare of the donor

- Don't forget about the donor once blood has been collected!
- Immediately initiate intravenous fluid therapy – a total of twice the volume of blood removed should be given over about 1–2 hours, after the blood has been collected.
- The cat should be kept warm, and its respiratory rate and pulse rate/quality monitored closely until fully recovered.
- If there are any concerns, or the cat is not recovering quickly from sedation, its blood pressure should be assessed, and any hypotension treated accordingly.
- The cat should be fed as soon as it is sufficiently awake.
- Cats can usually be discharged 3–5 hours after blood donation provided there have been no concerns or problems, and that they are fully recovered from the sedation.

Further information in the 'Feline blood transfusions' series:

● Practice pointers:
'Feline blood transfusions: practical guidelines for vets'
at www.isfm.net

● Cat owner pointers:
'Offering your cat to be used as a blood donor'
at www.fabcats.org

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**ISFM is the veterinary division of FAB, the leading cat charity
dedicated to feline wellbeing through improved knowledge**

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