



Immune-mediated Diseases - IMHA, IMTP and IMPA (part 2a)



I hope you enjoyed part 1 of this series on immune-mediated diseases. We are now going to look at three examples of immune-mediated disease - IMHA, IMTP and IMPA - and how they are treated. Part 2 is split into two sub-parts, part 2a covers IMHA, and part 2b (to follow next time) covers the rest.

Immune-mediated Haemolytic Anaemia (IMHA)

IMHA is a very serious disease in which the immune system starts attacking, and destroying, red blood cells. The destruction of red blood cells is called 'haemolysis', and when 'haemolysis' occurs in an uncontrolled fashion, as it does in IMHA, it leads to a



moderate or severe anaemia. **Anaemia means a 'reduction in the total number of red blood cells (or haemoglobin) in the blood stream'**. Red blood cells carry oxygen from the lungs to all other parts of our body and survival is impossible without them. Haemoglobin is the substance which oxygen attaches to in the red blood cell.

Destruction of red blood cells, as in IMHA, is one possible cause of anaemia, but anaemia can occur following a loss of red blood cells due to significant or prolonged bleeding, or can be due to insufficient production of new red blood cells. Hence, IMHA's rather long and complicated name is there to make clear the anaemia is caused by immune-mediated destruction of red blood cells.

Clinical Signs of IMHA

IMHA usually presents acutely (suddenly) with progressive lethargy and reduced exercise tolerance, possibly fainting or collapse, high heart rate and breathing rate, pale gums, and sometimes vomiting and anorexia. These all occur due to a lack of blood/haemoglobin, and therefore oxygen, to the brain, muscles, gums and gastrointestinal tract.



It is important to remember that these signs simply reflect ‘anaemia’, and similar signs will be seen with other types of anaemia, including anaemia following a significant internal or external bleed.

In severe cases of IMHA, the dog or cat may be jaundiced (yellow discolouration of the eyes, skin and/or gums). This occurs because destruction of red blood cells leads to production of bilirubin, which is a yellow pigment. If large numbers of red blood cells are destroyed quickly, significant quantities of bilirubin are released into the blood stream, and then build up in the tissues turning them yellow.

A serious complication of IMHA is the formation of blood clots in the blood stream, which get lodged in the lung or other organs. It is thought that half of animals that die from IMHA do so because of trapped blood clots and subsequent organ failure.

Investigation of IMHA

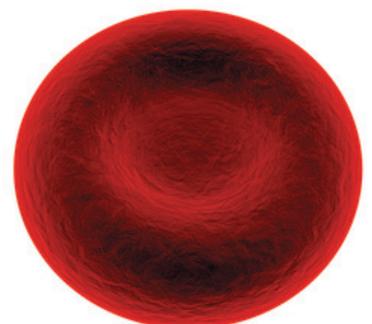


The first step in the investigation of IMHA is to determine if we are dealing with haemolytic anaemia, as opposed to any other anaemia. If IMHA is confirmed, we then check for underlying causes. If you remember from last time, as with other immune-mediated diseases, IMHA may occur spontaneously for no obvious reason (‘idiopathic’ IMHA), or may be secondary to certain infectious disease (especially tick-borne disease eg. Babesia), some drugs (eg.

paracetamol in cats), some toxins (eg. those found in onions), or cancer. It is essential to determine if there is an underlying cause to the IMHA in order to prevent ongoing destruction of red blood cells. Interestingly, there are also rare genetic diseases found in certain breeds which cause a haemolytic anaemia, but these are not immune-mediated diseases.

Although every case will vary, the investigation of IMHA will include some, or all, of the following:

- 1) Carrying out a clinical examination, including checking for evidence of bleeding internally or externally and assessing the severity of the anaemia.
- 2) Taking a detailed history to check if there has been access/exposure to drugs or toxins, or any history of travel abroad.
- 3) Measuring the PCV - this is a ‘count’ of the red blood cells which tells us how severe the anaemia is.
- 4) Doing a full blood test and urine test - this can help with the diagnosis of IMHA (eg. pick up increased bilirubin in the blood and urine), help identify underlying causes for it, and check for organ damage secondary to the IMHA.



- 5) Performing a blood 'smear' exam - this involves looking at the blood under a microscope; both IMHA and certain underlying causes (eg. some infections and toxins) can produce characteristic, visible changes in the red blood cells.
- 6) Doing a 'saline agglutination test' - this is a simple test that can be performed 'in house' to help support a diagnosis of IMHA.
- 7) Doing a 'Coombs' test' - this is the single best test for IMHA and is used to confirm diagnosis; however, for now, the blood needs to be sent off to an external lab.
- 8) Further imaging/investigation - this may be needed to rule out internal bleeding and check for underlying causes of IMHA such as tumours/cancer.

A Note on Anaemia

I thought I'd add this little note for those interested because it is a very important part in the investigation of anaemia.

Anaemia can be described as either '**regenerative**', or '**non-regenerative**', and it is essential to determine at the outset which of these it is. These terms describe the 'response' of the bone marrow to the reduction in red blood cell numbers. The bone marrow is the soft tissue inside our bones, where red blood cells, and other blood cells, are produced.



If the anaemia is 'regenerative', it means the bone marrow has detected the reduction in number of red blood cells and has started to produce more. It shows that the bone marrow is working correctly, and that the reduction in red blood cell number is due to a **loss** of red blood cells, rather than **insufficient production** of new red blood cells.

You see a 'regenerative response' following either 'haemolysis' (as in IMHA) or a bleed (haemorrhage) from somewhere. Its defining feature is an increase in number of a particular cell called a 'reticulocyte', which is an 'early' or 'immature' red blood cell.

In contrast, 'non-regenerative' anaemia means the bone marrow is not producing anymore red blood cells despite the low red blood cell count. This suggests there is either a primary problem with the bone marrow, or it is being suppressed for some reason. This topic is a whole article on its own, which I hope to cover one day.

It is possible to determine if an anaemia is regenerative by performing a blood test and blood 'smear' exam. These show whether reticulocytes are present, and if they are increased in number (unfortunately, this is actually very difficult in cats).

I hope you have enjoyed the first sub-part of part 2 of this series on immune-mediated disease. Please let me know if you have any questions about it. Next time, we shall look at IMTP and IMPA, and the treatment of all these diseases.