Veterinary Clinical Pathology

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Dedicated to my late father
G.Y. Somayajulu Garu
PREFACE

Continued demand for my book by the student body had necessitated the production of this Sixth edition. It is no little satisfaction to the author to find that his book is felt needed and is found useful by most of the Veterinary students of the country.

In this edition some parts are revised and many facts and conditions have been added to bring the contents of the book uptodate. As such the number of pages had to be increased. To make the information more authentic. I have made a departure in this edition, by requesting Professors of other colleges as well as some of our own college, to subscribe chapters or conditions in which they have specialised. By this means the students get benefitted by the experience and expertise of these Professors. I am grateful for the following persons for contributing on the subjects noted against their names to this part:

Ganti. A. Sastri
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Clinical pathology is that branch of pathology that is utilised at the bedside of the patient. This involves the use of various laboratory procedures and the interpretation of the data obtained. Clinical pathology is of great help to the clinician in arriving at a correct diagnosis of the disease he is called upon to treat. Besides, it helps him in his correct prognosis of the condition. The laboratory tests also inform the clinician about the efficacy of his treatment.
HEMATOLOGY

The function of blood are:
1. Transport of oxygen to the issues and carbon dioxide from tissues.
2. Transport of nutrients to the tissues.
3. Transport of products of metabolism for excretion through kidneys, lungs, liver, intestines and skin.
4. Control of water content of cells and interstitial fluid.
5. Regulation of body temperature by variation of its distribution.
6. Distribution of hormones for controlling body functions (Hormones in turn control the blood by action on hemopoietic organs).
7. Defence of body against bacterial invasion.
8. Immunity.

Since blood takes part either directly or indirectly in all biochemical processes of the body, it is but natural to expect alterations in it in disease. Hence examination of blood is a great adjunct in diagnosis of disease.

Collection of blood: Venous blood can be conveniently collected from the jugular vein in large animals. In dogs cephalic vein and the external saphenous vein may be used. The ear veins are used in the cat. In the pig blood can be collected from the anterior vena cava and in the rabbit and guinea-pig from the heart. Wing vein can be used in the fowl. In the case of rat and mouse blood is collected by snipping off a piece of the tail or from the heart direct.

For larger animals 5 ml of blood is quite sufficient for routine examinations. For small dogs and cats 2 ml of blood is sufficient.

Procedure for collection of blood: Note that for hematological work, the needle and syringe must be dry since presence of water hemolyses the red blood cells. The needle should in addition be sterile.
1. Clip the area from where the blood is to be drawn.
2. Apply tincture of iodine. Allow it to dry.
3. Raise the vein by pressure.
4. Use a large bore needle that has been sterilised and dried.
5. Insert the needle into the vein, draw into the dry syringe the required quantity of blood.
6. Disengage the needle, insert the syringe into the specimen tube (containing the anticoagulant) to very near its bottom and allow the blood to flow out without exerting any pressure on the piston. Immediately place the rubber stopper, place the tube on the palm of one hand and with the other make rotatory movement so that blood mixes with the anticoagulant.
7. Never shake the blood vigorously. Otherwise froth will form, red blood cells may be ruptured and erroneous results may be obtained.

Anticoagulants to be used

Oxalates: These are the cheapest. Oxalates combine with calcium and so coagulation is prevented. Ammonium oxalate swells the red cells while potassium oxalate
shrinks them. So a mixture of these in the proportion of 60:40 is used to keep the red cells in their normal state. The mixture of these two salts is known as Heller and Paul's oxalate mixture. This consists of 1.2 gms of ammonium oxalate and 0.8 gms of potassium oxalate in 100 ml of distilled water, 0.5 ml of this solution is placed in specimen tubes, 1 1/2" x 3/4" and kept in a bacteriological incubator overnight when the water evaporates leaving the salts. A rubber stopper is then provided to the specimen tube (a bark cork should not be used because it will absorb plasma leaving blood more concentrated, thus yielding erroneous results). This oxalate mixture is sufficient for 5 ml of blood giving thus a concentration of 2 mg of oxalate for 1 ml of blood. If smaller quantities of blood are utilised, proportionate quantity of the stock solution is pipetted into the specimen tube. For example, if only 2 ml of blood is to be collected, take 0.2 ml of the stock solution.

**Disadvantages**

1. Since oxalate is toxic, blood containing this is not useful for blood transfusion.
2. Platelets tend to be clumped.
3. If the blood is kept for sometime, while blood cells develop artefacts.
4. Blood with oxalates is not useful for the estimation of NPN, BUN and electrolytes.

**EDTA.** Ethylene diamine tetra acetate (a disodium salt is preferable). EDTA is a chelating agent, i.e. one that combines with calcium. This is an excellent anticoagulant. 1 mg of the powder for 1 ml of blood is used. If liquid is available 1 drop of a 10% solution is sufficient for 5 ml of blood. The solution is conveniently dispensed in plastic bottles which deliver a drop at a time when squeezed.

**Advantages**

1. Clumping of platelets does not occur.
2. Normal staining is not affected.
3. At room temperature, blood can be preserved for 6 hours.
4. Suitable for total protein and BUN estimation.

**Disadvantages**

1. Is not useful for blood transfusion.
2. Not suitable for estimation of calcium, magnesium, sodium, potassium and electrolytes.

**Erythrocyte Counts**

For enumeration of red cells, we require the following:
1. A counting chamber with cover glasses.
2. A diluting pipette.
Veterinary Clinical Pathology

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