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STOOL EXAMINATION

50.1 INTRODUCTION

Stool examination is carried out in laboratories for various diagnostic purposes. It is a specimen which is easily obtained but, they may however be a reluctance on the part of the patient to give the stool specimen due to its offensive nature and foul smell. Mostly a clean container which does not contain any detergent or disinfectant is sufficient for all types of stool examinations including stool culture.

OBJECTIVES

After reading this lesson, you will be able to :

- explain physical examination of stool
- describe microscopic examination of stool
- explain the chemical examination of stool
- describe the preservation of stool

50.2 PHYSICAL EXAMINATION OF STOOL

The following aspects of stool should be examined

(a) **Quantity**: In intestinal amoebiasis the stools tend to be voluminous. Whereas in bacillary dysentery due to Shigella the stools are scanty in quantity

(b) **Consistency and form:** Normal stools are well formed. In diarrhea and dysentery the stools are semi solid or watery in nature. In malabsorpton

states also the stool will be semi solid or watery depending on the severity of the disease. In cases of malabsorption of fats the stools are pale bulky and semi solid.

(c) Colour: Normal stools are light to dark brown in colour due to the presence of stercobilinogen which is a product of bilirubin metabolism. In cases with bleeding into the intestinal tract the stools become dark tarry in nature due to the formation of acid hematin if the bleeding is in the small intestines. In the bleeding in large intestines or rectum the blood may be bright red. In cholera the stools have a rice water appearance as there is no fecal matter and there is presence of flakes of epithelial cells in it.

In biliary tract obstruction the stools may be clay coloured due to absence of stercobilinogen. Pateints diet may also lead to alteration in the colour of the stools. For instance if the patient had spinach earlier the stools may be green in colour. In those who had a barium examination the stools may be white in colour.

(d) Odour: The fecal odour of stools may become offensive in conditions like intestinal amoebiasis. In cases of bacillary dysentery and cholera the stools are not foul smelling due to the absence of fecal matter.

(e) Blood: Blood should be noted in stools if present as it is indicative of ulceration or presence of any other pathology like malignancy. It should also be noted if the blood is bright red or is altered in colour as it may be a clue to the site of pathology in the intestinal tract.

(f) Mucus: Mucus is present in certain conditions like amoebic or bacillary dysentery.

(g) Parasite: Stools may contain adult helminthes. Nematodes like ascaris are easily visible as their size is large. Hook worms and proglotids of cetodes may also be present. These may be visible to the naked eye.

50.3 MICROSCOPIC EXAMINATION

The laboratory diagnosis of most parasitic infections is by the demonstration of ova of the parasite in the stools of the infected person. The stool is collected in a clean container. The stool can be examined by the following techniques.

(a) Wet mount examination

(b) Iodine preparation

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(c) Buffered methylene blue stain: (Nuclear stain in E histolytica)

(d) Cellophane tape test:- NIH swab

(e) Concentration techniques

(a) Saline wet mount examination: The stool is emulsified in normal saline and a large drop is placed on a glass slide and is then covered with a cover slip. This is then examined under a light microscope. It is preferable to keep the condenser down and the intensity of the light low for proper visualization of the ova and cysts. The thickness of the film should be such that one is able to see the printed letters of the newspaper through it.

(b) Iodine Preparation: Iodine preparation leads to better visualization of morphological details of ova and cysts as it stains the glycogen in them. It however has the disadvantage that the live trophozoites of Entamoeba histolytica cannot be seen as the iodine kills it. One gram of iodine and two gram of potassium iodide is mixed in 100 ml of distilled water Poassium iodide is mixed in water and then the iodine crystals are added and it is shaken vigorously.. The solution is then filtered into a dark glass bottle and kept away from light.

(c) Buffered methylene blue stain: It is used for the Nuclear stain in E histolytica

(d) Cellophane tape test: NIH swab (National Institute of Health) is used to pick up the ova of Entrobius vermicularis from the peri -anal area.

(e) Concentration methods:

Two types of concentration techniques are used for stool examination

(i) Sedimentation

(ii) Floatation

(i) Sedimentation technique

- Formol ether technique
- Formol ether SAF
- Formol ether PVA

(ii) Floatation technique

- Zinc sulfate
- Saturated salt solution

A small amount of stools are emulsified in saturated salt solution in a wide mouth container. When the stool becomes homogenous a few drops of saturated saline

are mixed and more saturated saline solution is added. A glass slide is placed across the receptacle in such a way that the slide is in contact with the surface of the saturated solution. If the fluid is not in touch with the slide then more saturated saline should be added till the fluid level touches the slide. The slide is then left in place for fifteen minutes. After this the slide is gently lifted off the container and turned upside down carefully ensuring no fluid from the slide is spilled. A cover slip is placed over the fluid on the slide. And it is examined under a microscope.

Principle of floatation technique: The specific gravity of ova and cysts is less and thus will float to the top of the saturated salt solution where it will stick to the under surface of the glass slide.

50.4 CHEMICAL EXAMINATION OF STOOL

(a) pH: This pH of stools is acidic in amoebic dysentery and is alkaline in bacillary dysentery.

(b) Occult blood: Occult blood may be present in a number of diseases including malignancy of the gastrointestinal tract. The reagent used is benzidine powder. A pinch of benzidine powder is taken in a test tube and acidified with 1-2 drops of glacial acetic acid and is mixed well in it. To this is added 1ml of hydrogen peroxide which is again mixed well. Then place a clean glass slide and place a small quantity of stool on it. Place 1-2 drops of the benzidine mixture prepared earlier on the stool specimen taken on the glass slide and observe for a change of colour. Development of green to blue colour is indicative of presence of occult blood in the stool specimen.

50.5 PRESERVATION OF STOOL

The stool samples containing the ova and cysts of parasites can be preserved by using one of the following methods

- 10% formol saline
- Buffered formol saline
- Merthiolate-iodine formalin
- Sodium acetate-acetic acid formalin(SAF)
- Polyvinyl alcohol (PVA)
- Schauddins preservative

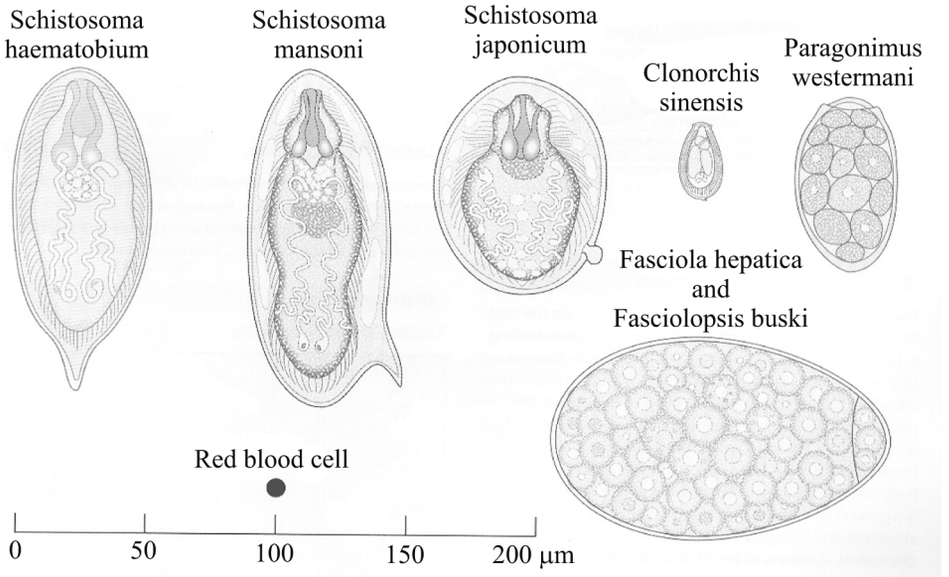


Fig. 50.1: Morphology of some common helminthic ova

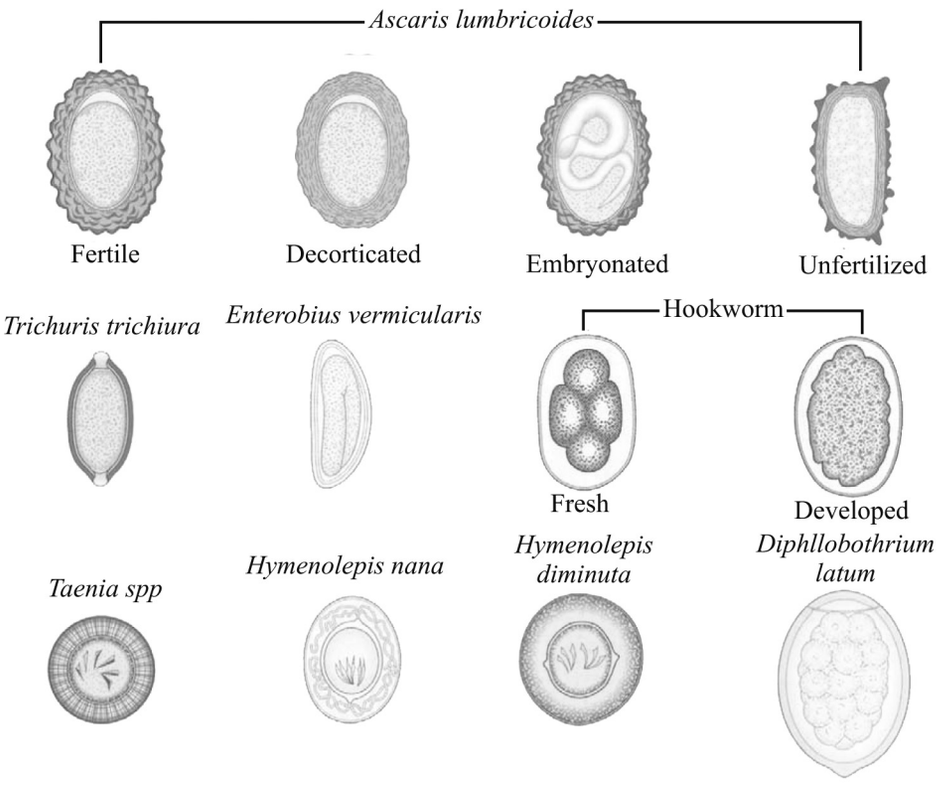
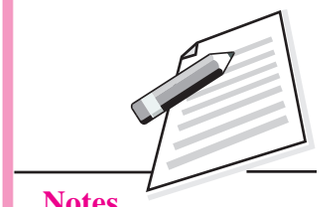


Fig. 50.2: Common helminth ova



INTEXT QUESTION 50.1

1. ..... stain is used for nuclear stain in E.histolytica
2. ..... swab is used in cellophane tape test
3. Cellophance test is used to identify .....
4. Two concentration techniques for stool examination are ..... & .....

WHAT HAVE YOU LEARNT

- Stool examination is carried out in laboratories for various diagnostic purposes
- A clean container which does not contain any detergent or disinfectant is sufficient for all types of stool examinations including stool culture
- Physical Examination of the stool for the following aspects of stool should be examined for its Quantity, Consistency and form, Colour, Odour, Blood, Mucus, Parasite
- The laboratory diagnosis of most parasitic infections is by the demonstration of ova of the parasite in the stools of the infected person.
- The stool can be examined by the following techniques namely Wet mount examination, Iodine preparation, Buffered methylene blue stain, Cellophane tape test:- NIH swab and Concentration techniques

TERMINAL QUESTIONS

1. Describe the techniques used for examination of stool
2. Describe the concentration method of stool examination

ANSWERS TO INTEXT QUESTIONS

50.1

1. Buffered methylene blue
2. NIH
3. Entrobius vermicularis
4. Sedimentation & Floatation