Course of Veterinary Clinical Pathology

For MSc students/ College of veterinary medicine- University of Basrah

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PhD; Vet. Int. & Prev. Med.

Syllabus

Week	Theory 1hr	Practice 3h	Date
1	Introduction and Lab safety	Introduction and Lab safety	
2-4	Bone marrow and Blood forming elements in diseases	Bone marrow exam. CBC interpretation results	
5-6	Liver function tests Kidney function tests	Biochemical analysis of serum Urinalysis	
7	Clinical Parasitology	Fecal exam. and Skin exam for parasitic causes	
8	**Med Term Exam. 30 M**		
9	Clinical bacterial diagnostic procedures	Clinical bacteriology tools for diagnosis	
10-13	Clinical bacterial diagnosis of : abortion, enteritis, upper respiratory tract diseases and skin diseases	Bacterial Diagnosis of : abortion Respiratory diseases Skin diseases	
14	Serology for brucellosis, TB and toxoplasmosis	RBT Latex Elisa	
15	Topics TBD	**Practice exam. 10M**	
	Yearly effort	**40 M**	
	Final	Practice **20 M** Theory **40 M**	
		60 M	
	Total	**100 M**	

Vet Cl path. MSc	Lab Safety	Dr Mohammed A.Y. Al-Amery

Introduction:

The correct diagnosis start by history taking from animal attendance or owner according to the complaint, that also associated by reviewing farm record or system, then veterinarian make an examination on patient or affected group of animals, and for more accuracy take the samples for laboratory detection such work explained by this course may face several hazard should be avoid by safe working.

Notes:

- dealing with extremely dangerous and hazardous chemicals, so caution is required at all times.
- **Staff can't be available at all times for supervision and for this reason; responsibility ultimately falls to the individual.**
- Avoid wasting samples, money and time.

Laboratory safety; is of paramount importance, created, to encourage and promote safe and efficient working practices in any lab.

Biosafety: is application of combinations of laboratory practice and procedures, laboratory facilities, and safety equipment when working with potentially biohazardous agents.

Biohazard: An agent of biological origin that has the capacity to produce deleterious effects on humans, i.e. microorganisms, toxins and allergens derived from those organisms; and allergens and toxins derived from higher plants and animals

Equipment hazard; This equipment is not only expensive, but can be delicate and easy to break. As a result, before using any new equipment it's important to get a better understanding of its proper use and best practices. Misusing lab equipment can result in injury, expense and a delay in your project.

Gases hazard; can cause a number of complications and may be toxic, corrosive and flammable. To ensure safety is of highest priority, only use the correct equipment for your project and ensure you're fully trained and prepared in handling dangerous gases. Just some of the things to be aware of include ventilation, safety valves and proper confinement.

Chemicals hazard; When conducting experiments in the lab and completing certain projects, you'll come into contact with a range of different chemicals. Chemicals such as acids can cause severe burns and damage to tissues and organs. Improper use can lead to severe health risks, whilst also presenting the possibility of a fire.

Most commonly hazards reported in more than 5,000 labs:

• Hepatitis, • Tuberculosis • Typhoid, Venezuelan Equine Encephalitis

• Brucellosis • Tularemia

- Fewer than 20% of cases were associated with known accidents.
- Exposure to infectious aerosols are plausible (but unconfirmed) for >80% of reported cases.

Basic Lab safety awareness measures include:

- Calling attention to any unsafe equipment (soon as possible).
- Labeling all equipment and ensuring chemicals are stored in the right containers
- The date is recorded when a chemical is opened
- Correct storage conditions and ensure to follow the guidelines
- When mixing chemicals, pour the more concentrated solution into the less concentrated – e.g. Add acid to water, not vice versa.

Personal safety in the laboratory:

- Wear safety goggles at all times
- Ensure a laboratory coat or apron is worn
- Use appropriate gloves when required
- Wear correct shoes
- Make use of a breathing mask if required.

Laboratory Protective Equipment

1-**Eye Protection;** Chemicals or objects in the laboratory can easily damage your eyes and as such, eye protection should be worn at all times. Safety goggle or glasses are compulsory.

2-Laboratory Coat; The laboratory coat is designed to protect your clothing and skin. This is from chemicals that could splash nearby. There is also the option of an apron, which can be worn on top to further protect from corrosive and irritating chemicals.

3-Gloves; When handling harmful chemicals it's important to wear protective gloves, to minimize the risk of injury. Check to ensure the gloves are in a good condition and free from holes, rips and tears.

Laboratory Safety Equipment

1-Chemical Storage Units; Hazardous chemicals should only be kept in small quantities to reduce the risk of problems occurring. This includes flammable and corrosive substances. It's equally important to return chemicals to their storage area as quickly as possible

2-Fire Safety Equipment; Before working in the laboratory you should familiarize yourself with the location of fire alarms and extinguishers. Ensure you're aware of an extinguisher's correct use and only apply if the fire is manageable. If this isn't the case, leave the area immediately and trigger an alarm.

3-Glassware; One of the greatest causes of accidents occurring in the laboratory is the poor use and handling of glassware. Incorrect use can lead to injury, so it's important to be well briefed before commencing with your project.

4-Eyewash Station; These are present in every laboratory and ensure you can quickly and easily rinse chemicals from your eyes if need be. Eyewash line should also be available and is of real importance, as water could push chemicals further into the eye.

First Aid & Emergency Procedures

1-Treatment Of Wounds

For wounds it's important to clean and cover the area quickly to avoid contamination.

1. Cleanse the wound with water and apply a sterile pad
2. Maintain pressure to control bleeding
3. Raise the wounded area above the heart if bleeding doesn't stop
4. Once bleeding has been controlled, use a dressing plaster.

2-Treatment Of Burns

First degree burns are less serious and third degree burns the most severe, but all must be treated adequately to prevent lasting damage.

- First degree burns will cause discoloration to the skin and lead to mild swelling. If burned, rinse the area for at least 10 minutes under cold water and apply skin cream.
- Second and third degree burns are more serious and can cause permanent scarring and blisters. To reduce skin damage, immediately rinse the area for at least 15 minutes and contact medical help. Do not apply ointment or creams.

Working and dealing with hazardous chemicals;

1-Skin Contact

- The most common complaint from skin contact with chemicals is **irritation**
- **mild to severe burn**.
- toxic chemicals can pass through to the bloodstream after coming into contact with skin.
- Eyes are one of the most sensitive areas and can be irritated by even the smallest of objects.
- Corrosive and toxic chemicals will cause extreme pain and injury.

2-Oral Ingestion

- Unless deliberate, oral ingestion of chemicals will be a complete accident and as such, can easily be avoided.
- If you ingest chemicals, seek medical advice.

3-Inhalation

- Inhalation is the most common way of chemicals entering your body and as such, precautions should be taken to ensure avoiding this.
- Even smallest amount of toxin inhaled into the body can be absorbed and cause damage.

Harmful Chemical Examples تعداد

In the laboratory, the chances are you'll be dealing with a whole range of dangerous chemicals. Below we list just a few of the more hazardous chemicals you could come face-to-face with.

1-Acetone is commonly found in laboratories, it is extremely flammable and has a low flash point – So it can be ignited at low temperatures. Acetone is therefore a severe fire hazard and may even cause an explosion if not handled correctly. Even spilling the chemical can be very dangerous as it's prone to reacting with oxidizing agents.

2-Chlorinated solvents can be very hazardous, causing **cancer** and lasting organ damage. They'll easily absorb into the skin.

3-Hydrofluoric acid can be harmful to people and can cause personal injury. Being both colorless and odorless, hydrofluoric acid is difficult to detect and won't 'burn' straight away when in contact with skin. Instead, it will eat into your flesh and bone, eventually getting into your blood stream. At this point the excruciating pain begins and if left untreated it's fatal.

Handling Of Liquefied Gases للاطلاع

With the liquefied gases there's a greater need to be aware of the potential dangers, and these are in fact more hazardous than handling liquids and solids. Before coming into contact with liquefied gases it's important to know their hazardous properties – flammability, chemical activity, corrosive effects etc. It's important to remember, liquefied gases can easily ignite with a low flash point and in many cases these gases are both odorless and colorless.

Hazards relating to liquefied gases include: للاطلاع

- Leaking gases, leading to effects such as toxicity, asphyxiation and formation of explosive concentrations.
- Low flash points increase the likelihood of a fire or explosion
- Low boiling point gases such as liquefied nitrogen and oxygen can cause frostbite when in contact with skin and tissue
- Effects such as corrosion, irritation and high reactivity.

The Biological Hazards are classed into four main groups:

- Group 1: biological materials unlikely to cause human harm. There has been a long history of safe use and these include non-pathogenic and disabled bacteria.
- Group 2: biological materials could be harmful and hazardous to workers if incorrectly managed. This includes *E. coli*, adenovirus and *clostridium*.

- Group 3: materials capable of causing serious harm and could even spread in the community. This category includes Hepatitis B and *Salmonella*.
- Group 4: In the most severe group are biological materials unlikely to be worked on in student laboratories. This would include highly contagious and dangerous strains of viruses, such as Ebola and Rabies.

Controlling the Hazard تعداد

1-Control at the source

The best preventative measure is to eliminate any hazard in the lab entirely. This would mean finding an alternative solution or substituting the hazardous material. If this isn't possible, steps should be taken to ensure the hazard is isolated and enclosed.

2-Control along the path

Some hazards can't be eliminated from the process, as this would affect your project. For these instances, a solution should be encouraged to reduce exposure. As an example, a ventilation system would reduce exposure of hazardous substances in the air, whilst screens would prevent flash from welding reaching the eyes of students.

3-Control at the student

If neither of the above are an effective solution, the third option is control at the student. This would include the use of specialist protective equipment and clothing, used to ensure injury and harm is eliminated. An example of this would be gloves when handling chemicals and earmuffs when loud noises are expected. Remember, the controlled can be a combination of all three to ensure better protection.

Electrical Hazards

As a general rule of thumb, when working with electrical appliances in the lab, remember to:

- Inspect all tools and equipment for signs of wear or damage before using. If anything untoward is noticed, report this to a supervisor
- Ensure all switchboxes are clean and closed
- Do not try to repair electrical equipment yourself. This should be left to competent and qualified personnel
- Do not use an extension cable as an alternative to permanent wiring
- Be aware of circuit breaker panels and ensure these are clearly marked.

Fire Hazards

Fire hazards are also prevalent in laboratories and precaution should always be taken to ensure risk is eliminated. There is a range of ignition sources and fire or explosions can lead to both loss of property and life.

General Housekeeping Rules

1. Ensure the good working order of machinery and tools, by keeping them in a clean and tidy condition
2. Avoid long use of machinery which could lead to overheating
3. Work with flammable materials away from flames and heat areas
4. Report leaks or equipment damage to a member of staff asap
5. Clean and wipe up spills immediately
6. Avoid using doorsteps with fire doors
7. Ensure emergency exits aren't blocked or locked
8. Keep the whole area in a tidy condition, including stairs, hallways and doorways
9. Always work in a small area and tidy as you go
10. Be aware of how to use fire extinguishers and other safety equipment

Biosafety Levels (BSL)

• BSL 1: agents not known to cause disease

• BSL 2: agents associated with human disease

• BSL 3: indigenous/exotic agents associated with human disease and with potential for aerosol transmission

• BSL 4: dangerous/exotic agents of life threatening nature.

Biological Waste Types

- Cultures, stocks, isolates
- Materials containing or contaminated with blood
- Sharps
- Pipettes, wrappers, tips
- All materials used in the lab and exposed to biohazards

Biological Waste Disposal

- Puncture proof, leak-proof, and sealable receptacles
- Avoid over filling
- Dispose of properly

Other to be determined