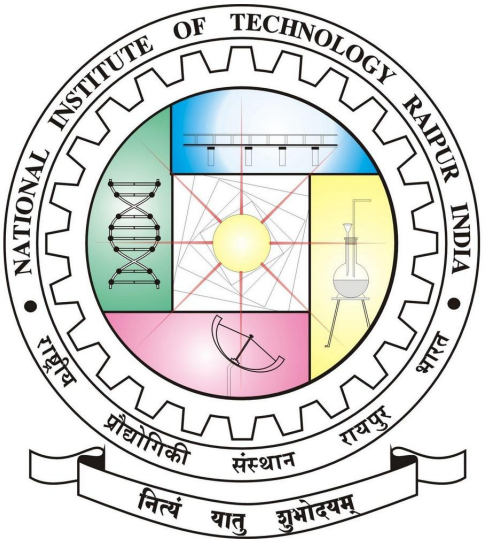

National Institute of Technology
Raipur

assignment 01

Medical Devices

Submitted To:
Saurabh Gupta
Asst. Professor
Department of Biomedical Engineering

Submitted By :
Apurv
21111012
First Semester
Biomedical Engineering

1 CAMERA PILL

1.1 INTRODUCTION

Capsule endoscopy is a procedure that uses a tiny wireless camera to take pictures of your digestive tract. A capsule endoscopy camera sits inside a vitamin-size capsule you swallow. As the capsule travels through your digestive tract, the camera takes thousands of pictures that are transmitted to a recorder you wear on a belt around your waist.

Capsule endoscopy helps doctors see inside your small intestine — an area that isn't easily reached with more-traditional endoscopy procedures. Traditional endoscopy involves passing a long, flexible tube equipped with a video camera down your throat or through your rectum.

1.2 Risk of Taking Capsule Endoscope :-

Overall, capsule endoscopy is a safe procedure, although there's a very small risk of the capsule getting stuck in your GI tract.

This is more likely to happen in individuals who have a significant narrowing in the GI tract due to things like:

¿ inflammation from an inflammatory bowel disease (IBD), such as Crohn's disease or ulcerative colitis (UC)

- the presence of large polyp or tumor - a previous surgery or injury that's caused part of the GI tract to be narrower

Many times, a capsule that's become stuck will eventually pass on its own. However, sometimes it may cause symptoms like:

- abdominal pain

- nausea

- vomiting

1.3 HOW TO PREPARE FOR A CAPSULE ENDOSCOPY:-

There are several things that you'll likely have to do in preparation for a capsule endoscopy:

-Maintain a clear liquid diet the day before your procedure.

- Take a laxative solution to help clear your GI tract, which can improve camera visibility.

- Don't eat or drink in the 10 to 12 hours prior to your procedure.

- Don't take certain medications that may interfere with the camera.

-)Size of the capsule:-

The capsule is 11mm x 26mm and weighs less than 4 grams

1.4 Can you eat during a capsule endoscopy:-

To help the camera capture clear images of your digestive tract, you'll be asked to stop eating and drinking at least 12 hours before the procedure. In some cases, your doctor may ask you to take a laxative before your capsule endoscopy to flush out your small intestine.

2 OCT

2.1 INRODUCION:-

Optical Coherence Tomography is a noninvasive imaging technology used to obtain high resolution cross-sectional images of the retina. The layers within the retina can be differentiated and retinal thickness can be measured to aid in the early detection and diagnosis of retinal diseases and conditions.

OCT testing has become a standard of care for the assessment and treatment of most retinal conditions. OCT uses rays of light to measure retinal thickness. No radiation or X-rays are used in this test, an OCT scan does not hurt and it is not uncomfortable.

You may be given an OCT scan for a variety of reasons, including monitoring of the progress of your disease, verifying or discounting suspected swelling of the retina or checking OCT results against other results to determine the effectiveness of the current medication regime.

2.2 What is Optical Coherence Tomography (OCT)

OCT is an imaging method used to generate a picture of the back of the eye, called the retina. The picture is made by precisely measuring the amount of a dim red

light that reflects off the retina. OCT is routinely used to image the eyes of patients with glaucoma.

The thickness of the nerve layer in the retina is easily measured with OCT. OCT is therefore being tested as a new way to follow patients with MS and test their recovery and response to treatments.

2.3 the limitations of the OCT

OCT cannot usually penetrate blood because of the high scattering caused by the difference in refractive index between serum and the cytoplasm of red blood cells (refractive index mismatch also causes the high scattering between lipid-based and water-based tissue).

2.4 Is optical coherence tomography safe?

Is an OCT scan safe? The OCT scanner is CE marked and the low powered laser light is safe, and cannot harm your eye. The OCT scan is suitable for use with people fitted with pacemakers or metallic implants and you can wear your hearing aid throughout the procedure.

2.5 Is optical coherence tomography expensive?

However, the most significant limitation of using OCT at the point-of-care is its high cost. In the field of ophthalmology, the price of a commercial OCT system can range between $40000 and 150\ 000$, and thus availability is usually restricted to large eye centers or hospitals .

3 NEBULIZER

3.1 INTRODUCTION:-

A nebulizer changes medication from a liquid to a mist so you can inhale it into your lungs.

Nebulizers come in home (tabletop) and portable models. Home nebulizers are larger, and you have to plug them into an electrical outlet. Portable nebulizers run on batteries, or you can plug them into a car outlet. Some are only a bit bigger than a deck of cards, so you can carry them in a bag or briefcase.

You may need a doctor's prescription for a nebulizer, or you can get one at your pediatrician's office. Many people also get breathing treatments at their doctor's office.

Home nebulizers cost about 50.

Health insurance policies usually cover nebulizers under their durable medical equipment portion. But most insurance companies want you to work with a certain supplier. Check with your insurance provider before buying or renting a nebulizer. Your health care team should be able to help you.

3.2 How to use a nebulizer

Email this page to a friend Print Facebook Twitter Pinterest Because you have asthma, COPD, or another lung disease, your health care provider has prescribed medicine that you need to take using a nebulizer. A nebulizer is a small machine that turns liquid medicine into a mist. You sit with the machine and breathe in through a connected mouthpiece. Medicine goes into your lungs as you take slow, deep breaths for 10 to 15 minutes. It is easy and pleasant to breathe the medicine into your lungs this way.

If you have asthma, you may not need to use a nebulizer. You may use an inhaler instead, which is usually just as effective. But a nebulizer can deliver medicine with less effort than an inhaler. You and your provider can decide if a nebulizer is the best way to get the medicine you need. The choice of device may be based on whether you find a nebulizer easier to use and what type of medicine you take.

Most nebulizers are small, so they are easy to transport. Also, most nebulizers work by using air compressors. A different kind, called an ultrasonic nebulizer, uses sound vibrations. This kind of nebulizer is quieter, but costs more.

Take the time to keep your nebulizer clean so that it continues to work properly.

Use your nebulizer according to the manufacturer's instructions.

The basic steps to set up and use your nebulizer are as follows:

Wash your hands well. Connect the hose to an air compressor. Fill the medicine cup with your prescription. To avoid spills, close the medicine cup tightly and always hold the mouthpiece straight up and down. Attach the hose and mouthpiece to the medicine cup. Place the mouthpiece in your mouth. Keep your lips firm around the mouthpiece so that all of the medicine goes into your lungs. Breathe through your mouth until all the medicine is used. This takes 10 to 15 minutes. If needed, use a nose clip so that you breathe only through your mouth. Small children usually do better if they wear a mask. Turn off the machine when done. Wash the medicine cup and mouthpiece with water and air dry until your next treatment.

3.3 Types of Nebulizers

There are three main types of nebulizers:

- Jet. This uses compressed gas to make an aerosol (tiny particles of medication in the air).

- Ultrasonic. This makes an aerosol through high-frequency vibrations. The particles are larger than with a jet nebulizer.

- Mesh. Liquid passes through a very fine mesh to form the aerosol. This kind of nebulizer puts out the smallest particles. It's also the most expensive.

4 BRANCHOSCOPE

4.1 INTRODUCTION:-

Bronchoscopy is a procedure that lets doctors look at your lungs and air passages. It's usually performed by a doctor who specializes in lung disorders (a pulmonologist). During bronchoscopy, a thin tube (bronchoscope) is passed through your nose or mouth, down your throat and into your lungs.

Bronchoscopy is most commonly performed using a flexible bronchoscope. However, in certain situations, such as if there's a lot of bleeding in your lungs or a large object is stuck in your airway, a rigid bronchoscope may be needed.

Common reasons for needing bronchoscopy are a persistent cough, infection or something unusual seen on a chest X-ray or other test.

Bronchoscopy can also be used to obtain samples of mucus or tissue, to remove foreign bodies or other blockages from the airways or lungs, or to provide treatment for lung problems.

There are 2 types of bronchoscope:

flexible and rigid. Both types come in different widths.

A rigid bronchoscope is a straight tube. It's only used to view the larger airways. It may be used within the bronchi to:

- Remove a large amount of secretions or blood
- Control bleeding
- Remove foreign objects
- Remove diseased tissue (lesions)

- Do procedures, such as stents and other treatments

A flexible bronchoscope is used more often. Unlike the rigid scope, it can be moved down into the smaller airways (bronchioles). The flexible bronchoscope may be used to:

- Place a breathing tube in the airway to help give oxygen

- Suction out secretions

- Take tissue samples (biopsy)

- Put medicine into the lungs

4.2 need of bronchoscopy

A bronchoscopy may be done to diagnose and treat lung problems such as:

- Tumors or bronchial cancer

- Airway blockage (obstruction)

- Narrowed areas in airways (strictures)

- Inflammation and infections such as tuberculosis (TB), pneumonia, and fungal or parasitic lung infections

- Interstitial pulmonary disease

- Causes of persistent cough

- Causes of coughing up blood

- Spots seen on chest X-rays

- Vocal cord paralysis

4.3 side effects of bronchoscope

Common complications may include shortness of breath, a drop in oxygen level during the procedure, chest pain, and cough.

5 APNEA MONITOR

-

5.1 INTRODUCTION

A person might use one of these monitors to track the breathing of an infant or an adult at risk of respiratory failure.

There are different types of monitors, but they all contain sensors that measure aspects of the body during sleep, such as breathing and movement.

Each device also contains a microcomputer that processes the information to determine whether breathing has stopped. If it has, the device sounds an alarm to wake the person or parents or caregivers.

The World Health Organization (WHO)Trusted Source warn that apnea monitors are subject to misreadings. They explain that movement, the person's heartbeat, and nearby electrical devices can each cause false readings.

5.2 Benefits of Apnea Monitor

If your kid has sleep apnea, you may want to consider purchasing a baby apnea monitor. Some of the benefits of cardiac apnea monitor are:

- The Device Will Notify You: It is critical to monitor your baby's heart and breathing rates if they have apnea. The gadget will sound an alert if your baby's heart rate falls below a certain level or if your youngster has a lengthy period of respiratory stoppage. This monitor is essential since it enables you to check your baby's breathing and heart rate continuously. The alert can notify you when your newborn is experiencing apnea, which may help you avoid a problem.

- Help You Identify Apneic Children: The monitoring equipment may assist you in determining whether or not your child is apneic. The monitor will warn you when your baby stops breathing, which is the most visible indicator of apnea. This monitor is also helpful for detecting variations in heart rate. It may assist you in preventing sleep apnea in your kid by providing critical information. Apnea is quite frequent in toddlers, and any newborn might develop apnea.

- Detects Variations in Heart Rate and Breathing: What does an apnea monitor detect?" Yet another benefit of employing an apnea monitor is that it can detect changes in heart rate and breathing patterns. Additionally, it aids in determining the kind of apnea your infant has. Apnea is classified into two primary types: central obstructive and mixed. Selecting the appropriate monitor for your kid will help avoid overdiagnosis and even save their life.

5.3 Risk of Apnea Monitor

A possible consequence is skin pain caused by the electrodes linked to your baby's skin, and this is not a significant worry in light of the project's setting. Unless your apnea monitor is fitted with a backup battery, it is conceivable that it will not operate if you lose power or encounter other electrical difficulties.

Consult your home health care provider to see if your monitor has a battery backup system. If this is the case, you must understand how to maintain a constant charge on the battery.

5.4 how to Use an Apnea Monitor

When a home health care company comes to your home to teach you how to operate a monitor, the authorities deem it an emergency. They will help you as long as you use the computer monitor. If you encounter difficulties with the monitor, you should contact the manufacturer.

-END-