

CHAPTER 6

1. MENINGITIS
2. HYPERKALEMIA (HIGH POTASSIUM)
3. SUBARACHNOID HEMORRHAGE
4. PNEUMOTHORAX VS. HEMOTHORAX
5. MEDICATION ADMINISTRATION



MENINGITIS

DURA MATER

ARACHNOID
MATER

PIA
MATER

SEVERE HEADACHE

PHOTOPHOBIA
(SENSITIVITY TO
LIGHT)

DIFFICULTY EXTENDING
THE LEG AT THE
KNEE

MELISSA IS SITTING UP
IN BED. SUDDENLY, SHE
TRIES TO EXTEND HER
LEG AND NOTICES IT
FEELS VERY PAINFUL.

NUCHAL
RIGIDITY
(NECK
STIFFNESS)

MENINGITIS AND
ICP MONITORING

A CASE
STUDY

THE COMPLETE CASE STUDY
CAN BE ACCESSED @
www.dearnurses.com

MENINGITIS - ICP MONITORING

MELISSA IS ADMITTED TO ICU

DIAGNOSTICS TESTS ARE DONE IN ICU

THROAT CULTURE IS DONE.

SINUS TACHYCRDIA
-DUE TO
FEVER CAUSED
BY INFECTION



BLOOD PRESSURE

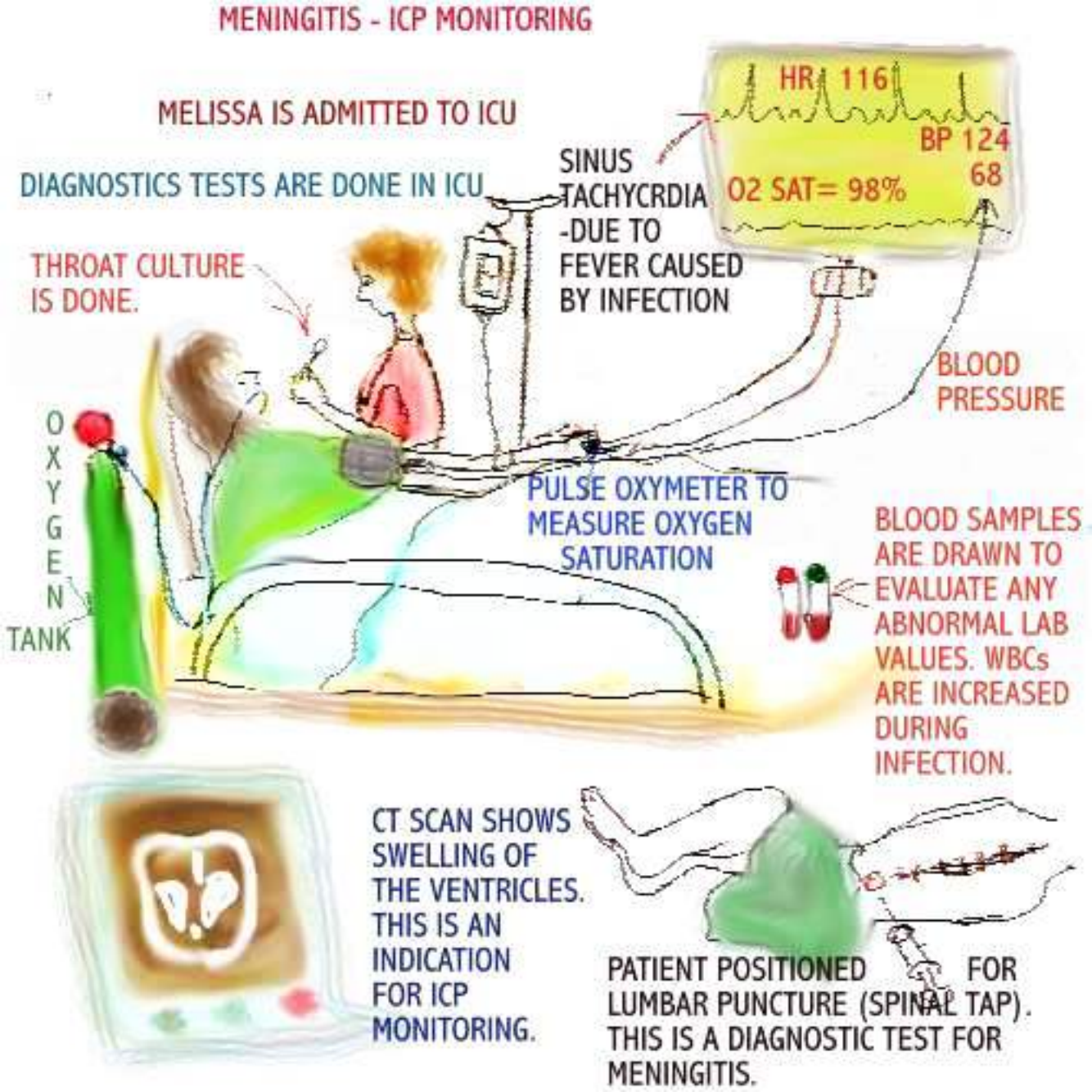
PULSE OXYMETER TO MEASURE OXYGEN SATURATION

BLOOD SAMPLES ARE DRAWN TO EVALUATE ANY ABNORMAL LAB VALUES. WBCs ARE INCREASED DURING INFECTION.

OXYGEN TANK

CT SCAN SHOWS SWELLING OF THE VENTRICLES. THIS IS AN INDICATION FOR ICP MONITORING.

PATIENT POSITIONED FOR LUMBAR PUNCTURE (SPINAL TAP). THIS IS A DIAGNOSTIC TEST FOR MENINGITIS.



CAUSES OF MENINGITIS



MENINGITIS IS CAUSED BY INFLAMMATION OF THE MENINGEAL COVERINGS OF THE BRAIN AND SPINAL CORD. THIS INFLAMMATION MAY BE BROUGHT ON BY BACTERIA, A VIRUS, FUNGI, TUMORS OR CHEMICAL IRRITANTS.

BACTERIAL MENINGITIS IS COMMON IN THE COLDER MONTHS AND IS CAUSED BY THE HAEMOPHILUS INFLUENZAE OR NEISSERIA MENINGITIDES.

VIRAL OR ASEPTIC MENINGITIS IS LESS SEVERE THAN BACTERIAL MENINGITIS AND IS FREQUENTLY SEEN IN THE SUMMER MONTHS. CAUSES INCLUDE MUMPS, MEASLES, AND HERPES ZOSTER.

FUNGAL MENINGITIS MAY BE SEEN IN PATIENTS WITH HIV DISEASE. THE ORGANISM MOST OFTEN RESPONSIBLE IS CRYPTOCOCCUS NEOFORMANS.

MENINGITIS MAY ALSO BE CAUSED BY MYCOBACTERIUM TUBERCULOSIS.

SIGNS AND SYMPTOMS



- HIGH FEVER, SEVERE HEADACHE, NAUSEA AND VOMITING
- PHOTOPHOBIA (SENSITIVITY TO LIGHTS), IRRITABILITY
- ALTERED LEVEL OF CONSCIOUSNESS
- KERNIG'S AND BRUDZINSKI'S SIGN
- NUCHAL RIGIDITY

INTERVENTION

THE DOCTOR WILL DETERMINE THE MEDICATIONS TO BE USED, DEPENDING ON THE CAUSE OF MENINGITIS. DRUGS SUCH AS PENICILLIN, CLAFORAN AND ROCEPHIN ARE USED TO TREAT BACTERIAL MENINGITIS. ACYCLOVIR (ZOVIRAX) IS USED TO TREAT VIRAL MENINGITIS.

AMPHOTERICIN B IS USED IN THE TREATMENT OF FUNGAL MENINGITIS. IF THERE IS A TUMOR, SURGICAL INTERVENTION MAY BE NECESSARY.

BRADYCARDIA



ADMISSION HISTORY

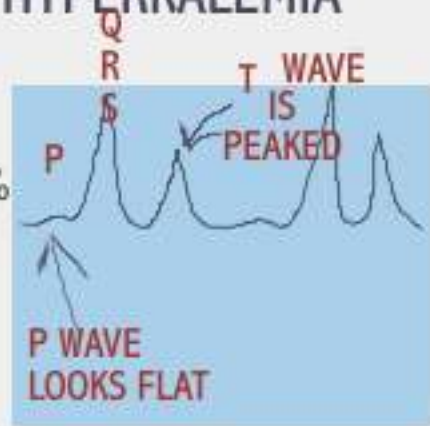
MARY WAS JUST ADMITTED TO THE CCU FOR A CARDIAC WORKUP. SHE CALLED HER DOCTOR COMPLAINING OF MILD CHEST PAIN ON AND OFF FOR ABOUT 4 HOURS.

SHE ALSO COMPLAINED OF FEELING UNUSUALLY TIRED. HER DOCTOR ADVISED ADMISSION TO THE CCU. LAB VALUES FOR A CARDIAC WORKUP WAS DONE AND REVEALED A $K^+ = 6.2$.

NORMAL POTASSIUM = 3.5 - 5.0.

MARY WILL SOON LEARN FROM HER DOCTOR, THAT HER PROBLEMS ARE NOT CARDIAC IN NATURE.

HYPERKALEMIA



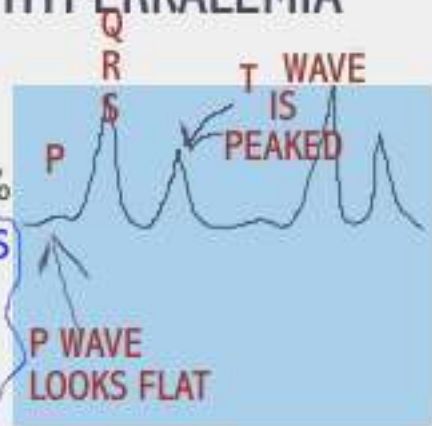
SIGNS AND SYMPTOMS OF HYPERKALEMIA

- BRADYCARDIA
- MILD CHEST PAIN
- PALPITATIONS
- ANXIETY
- FATIGUE, MUSCLE WEAKNESS
- NUMBNESS AND TINGLING
- HYPOTENSION
- NAUSEA, VOMITING
- EKG CHANGES SUCH AS FLATTENED P WAVE, ELEVATED T WAVE, VENTRICULAR ARRHYTHMIAS

BRADYCARDIA



HYPERKALEMIA



CAUSES OF HYPERKALEMIA

- TRAUMA
- RENAL FAILURE
- DIURETICS SUCH AS (ALDAKTONE) SPIRONOLACTONE
- INTERNAL BLEEDING
- SALT SUBSTITUTES
- ADRENAL INSUFFICIENCY
- METABOLIC ACIDOSIS
- RAPID INTRAVENOUS INFUSION OF POTASSIUM

MARY'S HYPERKALEMIA (ELEVATED POTASSIUM) WAS CAUSED BY HER KIDNEYS. HER KIDNEYS WERE NOT ABLE TO FUNCTION NORMALLY AND WERE RETAINING POTASSIUM. HEMODIALYSIS WAS THE TREATMENT ORDERED FOR MARY. DIETARY CHANGES WERE ALSO ORDERED.



IDENTIFYING HYPERKALEMIA AND ITS TREATMENT

POTASSIUM IS AN ELECTROLYTE JUST LIKE SODIUM AND IS NECESSARY FOR CELL FUNCTION SUCH AS IN THE HEART. TOO MUCH OR TOO LITTLE, MAY POSE SERIOUS CONSEQUENCES.

TREATMENT OF HIGH POTASSIUM IS CONSIDERED AN EMERGENT SITUATION.

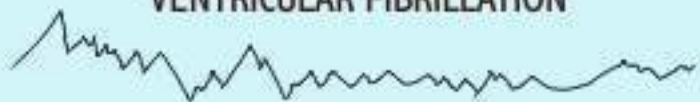
TREATMENT IS USUALLY DIRECTED AT THE CAUSE. HEMODIALYSIS WOULD BE THE TREATMENT USED FOR RENAL FAILURE. DIETARY CHANGES WOULD ALSO BE ORDERED. MEDICATION ADMINISTRATION IS ALSO USED.

HYPERKALEMIA MAY CAUSE CARDIAC ARRHYTHMIAS

ASYSTOLE



VENTRICULAR FIBRILLATION



BANANAS



SALT
SUBSTITUTE

DIETARY CHANGES ARE MADE IN ORDER TO LOWER POTASSIUM.

TREATMENT

MEDICATIONS USED :

- KAYEXALATE (BY MOUTH OR RECTALLY (ENEMA) TO REMOVE POTASSIUM FROM THE GI TRACT.
- SODIUM BICARBONATE TO CORRECT METABOLIC ACID -OSIS.
- DIURETICS
- INTRAVENOUS INSULIN AND GLUCOSE FOR FAST ACTION

SUBARACHNOID HEMORRHAGE

EXPLOSIVE HEADACHE



BLEEDING INTO THE SUBARACHNOID SPACE, CAUSED BY A RUPTURED ANEURYSM

MR.P LOVES TO RUN EVERY MORNING. THIS MORNING AFTER RUNNING, HE SUDDENLY HAS AN EXPLOSIVE HEADACHE THAT IS ALMOST PARALYZING.

MR.P GOES TO THE EMERGENCY ROOM AFTER CALLING HIS DOCTOR, WHO ADVISES HIM TO GO THERE.

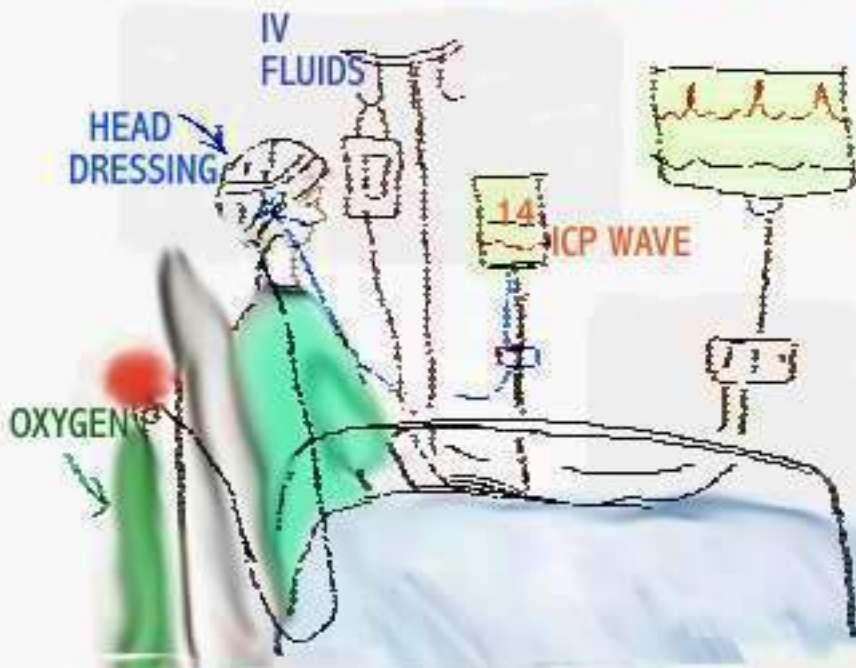
MR.P IS EXPERIENCING THE SYMPTOMS OF A SUBARACHNOID HEMORRHAGE. THIS WAS CAUSED BY A RUPTURED CEREBRAL ANEURYSM.

SYMPTOMS INCLUDE :

EXPLOSIVE HEADACHE, PHOTOPHOBIA
NUCHAL RIGIDITY (NECK STIFFNESS)
NAUSEA, VOMITING
KERNIG'S SIGN, BRUDZINSKI'S SIGN

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MR.P IS ADMITTED TO ICU



WHEN A SUBARACHNOID BOLT IS PUT IN PLACE, THE ICP SHOULD BE RECORDED Q1 HR OR AS ORDERED. ANY SIGNIFICANT CHANGES SHOULD BE DOCUMENTED.

IT IS VERY IMPORANT TO ASSESS AND DOCUMENT THE NEUROLOGICAL STATUS OF THE PATIENT AT ALL TIMES. ANY CHANGES SHOULD BE REPORTED.

MR.P HAD WAS DIAGNOSED WITH A RUPTURED CEREBRAL ANEURYSM. HE HAD SURGICAL INTERVENTION TO HAVE CLIPPING OF HIS ANEURYSM DONE. A SUBARACHNOID BOLT TO MEASURE THE ICP WAS PUT IN PLACE.



A SUBARACHNOID BOLT CAN MEASURE THE ICP, BUT DOES NOT USUALLY DRAIN CSF FROM THE VENTRICLE.

THE BRAIN IS AT RISK FOR INFECTION

A SUBARACHNOID BOLT IS PLACED IN THE SUBARACHNOID SPACE.



An aneurysm is a ballooning or bulging in a blood vessel.

Aneurysms may occur in the brain or abdomen (the aorta). They may or may not rupture. Symptoms vary depending on location and severity.

Diagnosing a SAH is usually done by CT Scan or MRI. Symptoms are very similar to meningitis. Severe headache, nuchal rigidity, Brudzinski's and Kernig's signs are all symptoms.



DIAGNOSING RUPTURE OF A CEREBRAL ANEURYSM, WHICH LEADS TO SUB - ARACHNOID HEMORRHAGE

PNEUMOTHORAX

- SIGNS AND SYMPTOMS
- ANXIETY
 - SHORTNESS OF BREATH
 - RAPID RESPIRATIONS
 - TACHYCARDIA
 - A DECREASE IN OXYGEN SATURATION
 - HYPOTENSION

TACHYCARDIA
HR=120

BP 90/45

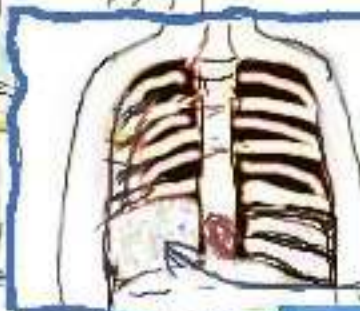
RESPS
= 32

O2 SAT 89%

NURSE
HELP
ME!

I AM GOING
TO CHECK
YOUR LUNG
SOUNDS

OXYGEN TANK



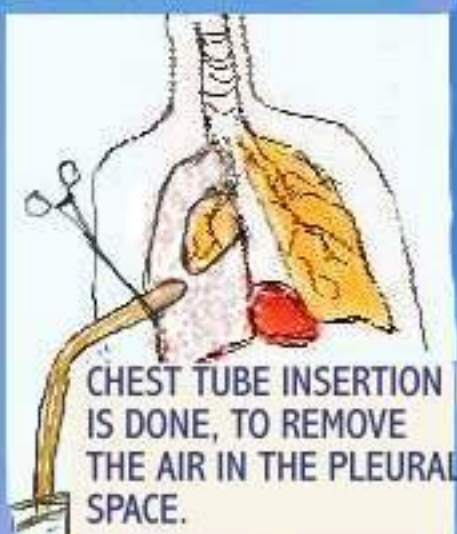
CHEST X-RAY
IS DONE TO
CONFIRM
DIAGNOSIS.
AIR IN THE
PLEURAL SPACE

BREATH SOUNDS ARE
DECREASED ON THE
AFFECTED SIDE.

DISTENDED
NECK VEINS

AIR
IN
THE
PLEURAL
SPACE

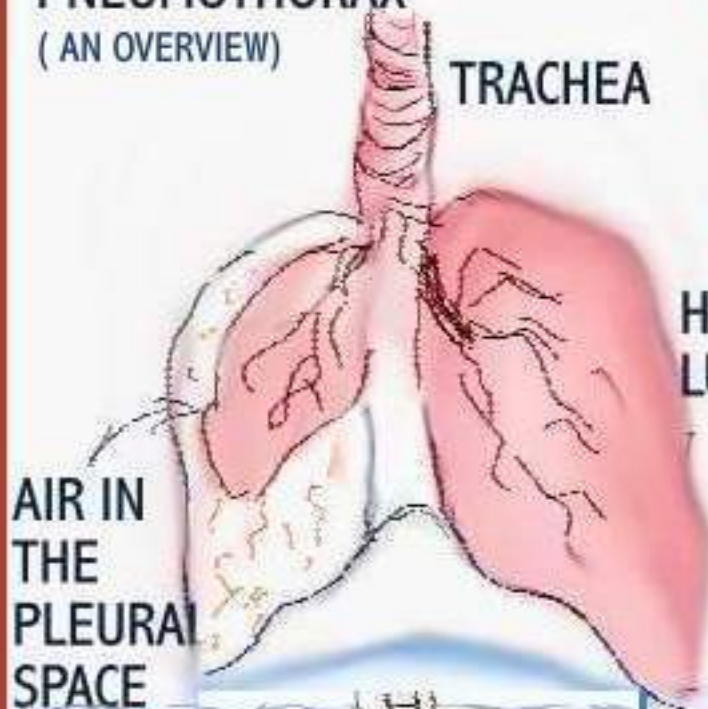
DEVIATION OF
THE TRACHEA AWAY
FROM THE SIDE OF
THE PNEUMOTHORAX
SUDDEN, SHARP
CHEST PAIN



CHEST TUBE INSERTION
IS DONE, TO REMOVE
THE AIR IN THE PLEURAL
SPACE.

PNEUMOTHORAX

(AN OVERVIEW)

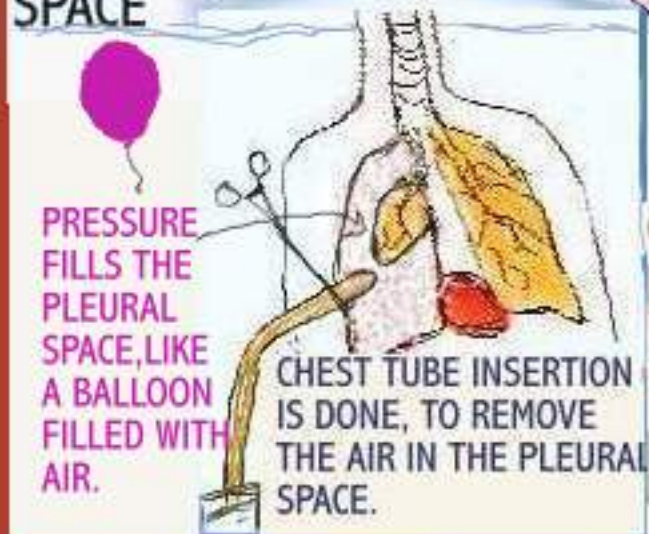


HEALTHY LUNG

Q- WHAT IS A PNEUMOTHORAX?
A - NORMALLY, THERE ARE TWO LUNGS (RIGHT AND LEFT) LOCATED WITHIN THE CHEST CAVITY. THE LUNGS ARE COVERED BY TWO MEMBRANES. THE INNER MEMBRANE IS IN DIRECT CONTACT WITH THE LUNG. THE OUTER MEMBRANE IS IN CONTACT WITH THE CHEST WALL. BETWEEN THE TWO LAYERS IS THE PLEURAL SPACE. THERE IS SEROUS FLUID BETWEEN THESE LAYERS AS WELL AS NEGATIVE PRESSURE IN THIS SPACE.

IF FOR ANY REASON, AIR ENTERS THE PLEURAL SPACE AND CHANGES THE PRESSURE TO POSITIVE, IT COMPRESSES THE LUNG AND CAUSES A PNEUMOTHORAX.

CAUSES OF A PNEUMOTHORAX INCLUDE, BUT ARE NOT LIMITED TO: PENETRATING CHEST WOUNDS LIKE A GUNSHOT OR STAB WOUND, LUNG INFECTIONS SUCH AS TUBERCULOSIS, CANCER OR BAROTRAUMA. IT MAY ALSO OCCUR SPONTANEOUSLY.



PRESSURE FILLS THE PLEURAL SPACE, LIKE A BALLOON FILLED WITH AIR.

CHEST TUBE INSERTION IS DONE, TO REMOVE THE AIR IN THE PLEURAL SPACE.

PATIENTS BECOME VERY ANXIOUS!



TAKE QUICK ACTION - ASSESS, CALL FOR HELP, DOCUMENT, REASSURE PATIENT!

Cyanosis

Help me

Tachypnea- rapid respirations

Tachycardia -rapid heart rate

OXYGEN

PULSE OXIMETER -measures oxygen saturation

Cyanosis- bluish discoloration of the skin

ABSENT BREATH SOUNDS

HYPOTENSION - DECREASE IN BLOOD PRESSURE

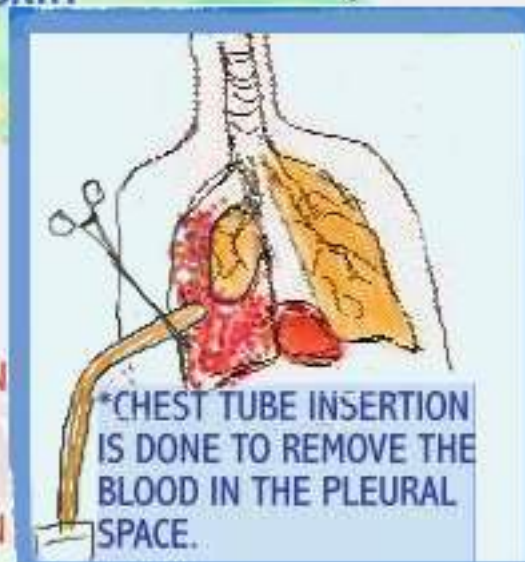
BLOOD IN THE PLEURAL SPACE

CHEST PAIN

HEMOTHORAX

DUE TO

LACK OF OXYGEN

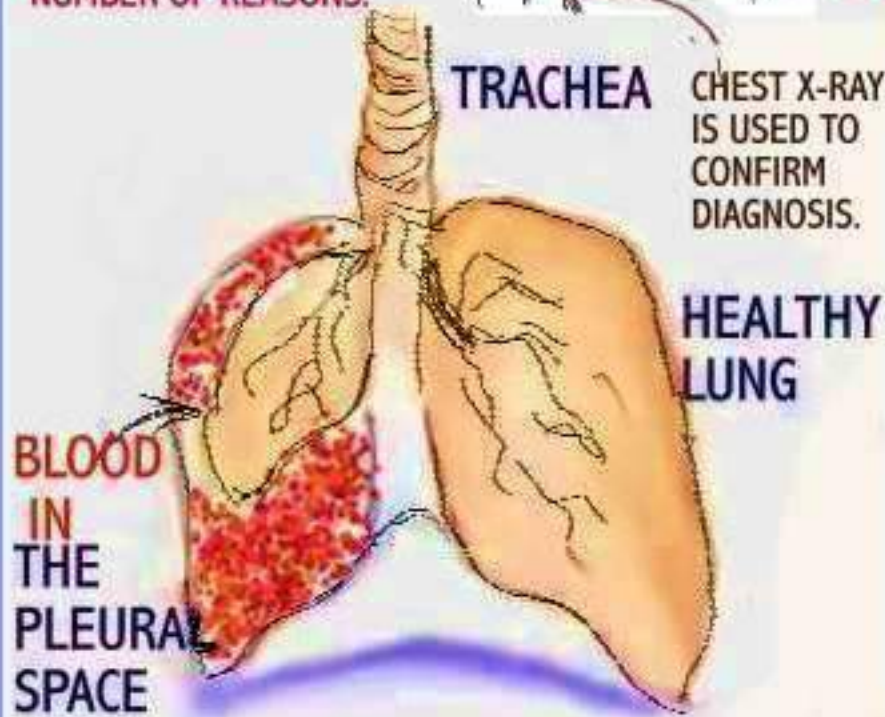


***CHEST TUBE INSERTION IS DONE TO REMOVE THE BLOOD IN THE PLEURAL SPACE.**

Q- WHAT IS A HEMOTHORAX?
A- A HEMOTHORAX IS AN ACCUMULATION OF BLOOD IN THE PLEURAL SPACE. IT CAN BE CAUSED BY A NUMBER OF REASONS.



**CAUSES INCLUDE, BUT ARE NOT COFINED TO :
BLUNT OR PENETRATING CHEST TRAUMA, THORACIC SURGERY OR ANEURYSM AND ANTICOAGULATION THERAPY.**



HELPFUL HINTS

- REASSURE AND ASSESS PATIENT
- GIVE OXYGEN,
- CHECK VITAL SIGNS, OXYGEN SATURATION AND LUNG SOUNDS
- DOCUMENT ALL FINDINGS
- GET HELP AS SOON AS POSSIBLE
- NOTIFY MD AS SOON AS POSSIBLE

WHAT IS A HEMOTHORAX?

***CHEST TUBE INSERTION IS DONE TO REMOVE THE BLOOD IN THE PLEURAL SPACE.**

MEDICATION ADMINISTRATION



I always have trouble with knowing the right route. I guess it is not that important.

FIVE RIGHTS

- RIGHT PATIENT
- RIGHT DRUG
- RIGHT DOSE
- RIGHT ROUTE
- RIGHT TIME

**HEY YOU!
THIS IS NOT A
GUESSING GAME.**

INTRAMUSCULAR INJECTIONS

SUCH AS PAIN MEDICATIONS ARE GIVEN IN THE MUSCLE, WHICH IS DEEPER THAN THE FATTY TISSUE.



HELPFUL HINT:

DRAW AN IMAGINARY CROSS IN THE BUTTOCKS AND USE THE UPPER, OUTER QUADRANT FOR IM INJECTIONS.

AVOID THE SPINAL COLUMN AND POSSIBLE DAMAGE TO THE SCIATIC NERVE.

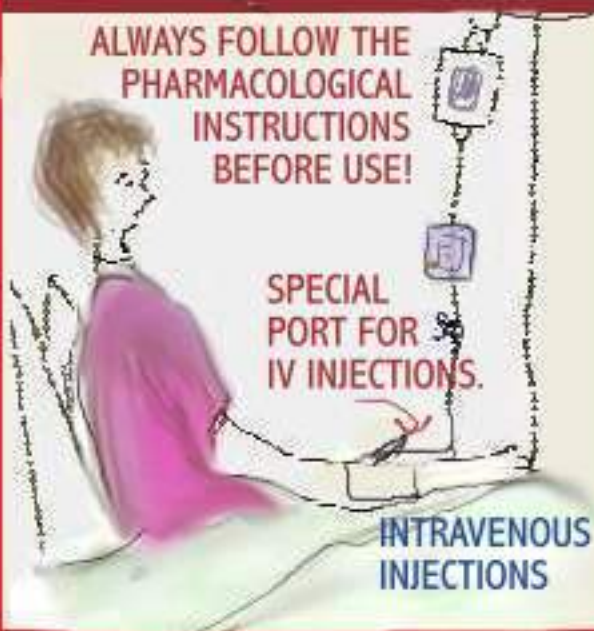
UPPER, OUTER QUADRANT



ALWAYS FOLLOW THE PHARMACOLOGICAL INSTRUCTIONS BEFORE USE!

SPECIAL PORT FOR IV INJECTIONS.

INTRAVENOUS INJECTIONS



SUBCUTANEOUS INJECTIONS

INSULIN AND HEPARIN ARE GIVEN IN THE FATTY TISSUE UNDER THE SKIN. THE AREAS MARKED ARE USED AS A GUIDE.



Hey you, that's not good enough!



I say if they are the same color and size, chances are they are the same dose.

- 1 TAB = 1GM
- 1 TAB = 1MG
- 1 TAB = 250 MG
- 1 TAB = 500 MG

HELPFUL HINT:

MANY PILLS MAY HAVE THE SAME COLOR, BUT THAT DOES NOT MEAN THEY ARE OF EQUAL STRENGTH. IT IS IMPORTANT TO KNOW HOW TO DISTINGUISH 1GM FROM 1MG.

1 GM = 1,000 MG

0.5 GM = 500 MG

0.25 GM = 250 MG

0.001GM = 1 MG

MEDICATION ADMINISTRATION