PREGNANCY WITH PULMONARY HYPERTENSION

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OBJECTIVES

WHAT THE OBSTETRICIAN KNOW ABOUT THE PULMONARY HYPERTENSION IN PREGNANCY

- WHAT IS PULMONARY HYPERTENSION
- CLINICAL FEATURES SUGGESTIVE OF DIAGNOSIS
- INVESTIGATIONS HELP FUL IN DIAGNOSIS
- MORTALITY RATE AND WHY HIGH MORTALITY
- WHICH CONTRACEPTION IS SAFE
- SAFETY OF DRUGS IN PREGNANCY
- TIME OF DELVERY
- MODE OF DELVERY
- WHICH ANALGESIA / ANESTHESIA IS USED
- BRESTFEEDING
- FOLLOW UP

CASE

You are registrar Incharge of high risk opd you received a women who is 7 weeks pregnant with one paper which shows she is K/C of pulmonary HTN , NYHA class ii and on bosentan and warfarin





- **Q ASKING. FROM HER**
- IS THIS UR PLANNED PREGNANCY?
- IF NO ---ARE YOU HAPPY TO CONTINUE THIS PREGNANCY?
- DID U RECEIVED PRE-PREGNANCY COUNSELING?
- HAVE U STARTED FOLIC ACID?
- CAN YOU TELL ME MORE ABOUT YOUR HEART PROBLEM
- WHEN DID YOU SEE YOUR DOCTER LAST TIME ,
- WHAT DID HE SAY ABOUT YOUR CONDITION,
- ANY RECENT TEST HAD DONE HEART TRACE AND ULTRASOUND OF HEART (ECG ECHO ,) R THEY NORMAL ,
- WHAT MEDICATIONS ARE U TAKING . R U TAKING IT REGULARY
- ANY RECENT ADMISSION TO HOSPITAL ?
- HOW ARE YOU NOW, R U ABLE TO DO ROUTINE HOUSE CHORE, ANY SOB, ANY SLEEP DISTRUBANCE DUE TO SOB, R U ABLE TO CLIMBS STAIRS COMFORTABLY ?
- DO U FEEL PAIN IN CHEST OR IN TUMMY , ANY FAINTING OR LIGHT HEADEDNES DO U NOTICE ANY CHANGE IN HEART BEAT OR APPETITE
- ANY LEG AND ANKLE SWELLING.

- **Past obstetrical history**
- **Menstrual history** lmp , cervical smear , contraception
- **Medical history** apart from this heart problem other medical problem ,any blood clot in leg
- **Surgical history** any surgery in past
- **Family history** --- family history of concerns
- (especially heart disease in family ,blood clot)
- **Drug history** a part from bosentan and warfarin are you taking any other medications are u allergic to drug F.A/MV/ASPIRINE
- **Social history** (support)
- do you smoke, drink, recreational drugs

- **she need termination of preg** -----tell in her own language so she understand

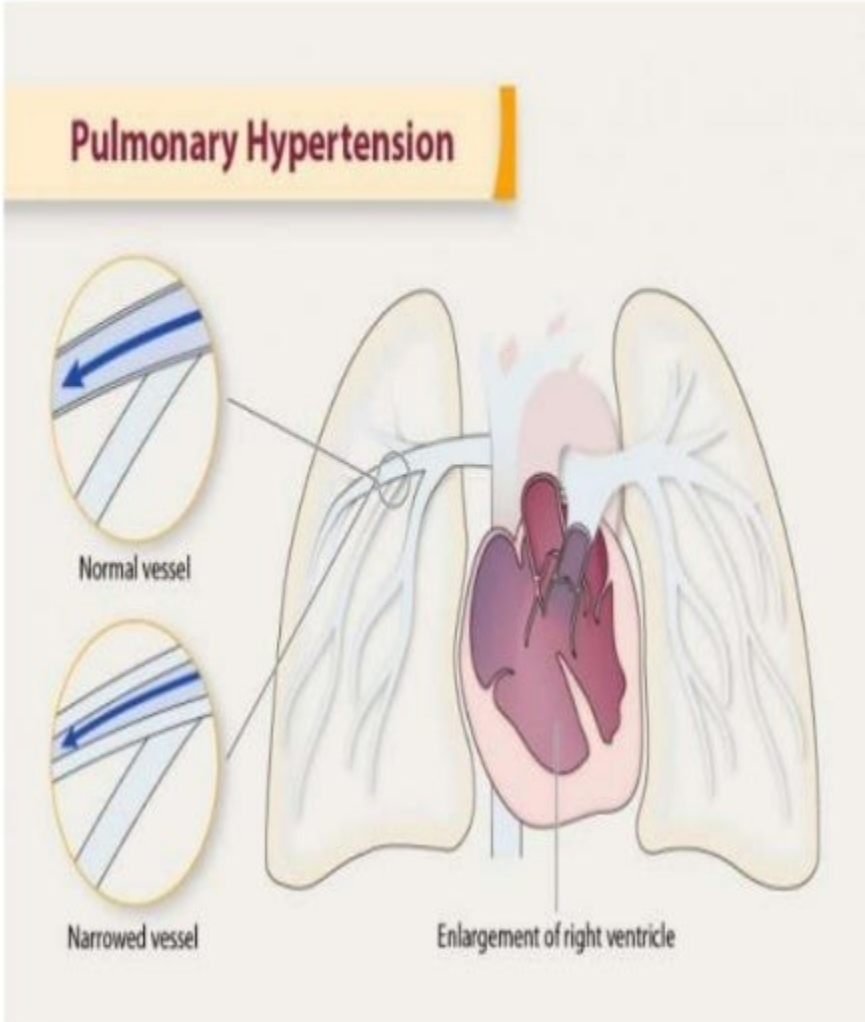
- actually I have to give some serious information before you take this decision about this pregnancy

- **Pulmonary hypertension (PH) means high blood pressure in the lungs,.**

- Every pregnant women who are completely healthy there heart — becomes overloaded with work during pregnancy and even more so during labor and delivery.

- In a patient who suffers from pulmonary hypertension and whose heart is already under stress, the risks are particularly high and could result in the death of the mother.

- we strongly recommend to end this pregnancy ,how ever its up to you ,decision is yours , and we will support you whether you want to continue the pregnancy or you want to go for termination,



- **maternal risk** ------she may have problems with her and her baby, like,
- heart failure ,
- icu admission
- Increase need of ,oxygen ,
- Increased chances of blood to clot ,
- long term hospital admission ,
- early delivery, high risk of death during pregnancy
- we care about your life we don't want to lose you , we may decide to end pregnancy if your health is compromised at any stage
- **fetal risk** u may miscarry or
- ur baby may not grow well
- there is small increase risk of early delivery and problems of early delivery







- **<u>antenatal care</u>** Look if you want to continue with this pregnancy we will support you in all the way ,
- your ANC will be in consultant led unit clinic ,
- your care will be shared by MDT group of specialist team includes,heart doctor, consultant obstetrician , icu consultant,anesthetist ,paediatrician
- I would recomand you to refer u urgently to cardiologist he will review your condition and review ur drugs u may need change of drugs
- bcs boseton and warfarin are not safe for baby , you may need blood thinning injections inspite of warfarin ,its unlikely that baby is effected by warfarin. if you continue we will refer you to FMU for anomaly scan,
- I will arrange an urgent appointment with consultant cardiologist
- These are some patient information leaflets it will be helpful



PULMONARY HYPERTENSION

- Pulmonary hypertension is a challenging disease to diagnose, accurately classify, and treat.
- (PH) is defined at cardiac catheterization as a mean pulmonary artery pressure (mPAP) of at least or >25 mmHg at rest
- IPAH is a severe, progressive disease with an incidence of 1–2 cases per million of population / year
- and is **three times** more common in women.
- With "conventional" treatment, it has a median survival time of 2.8 years from diagnosis; however, with new therapies there has been a doubling of the survival time.
- Younger patients have seen the greatest improve-ment in outcome, with 5-year survival approximating 80% in patients with IPAH

Classification of pulmonary hypertension

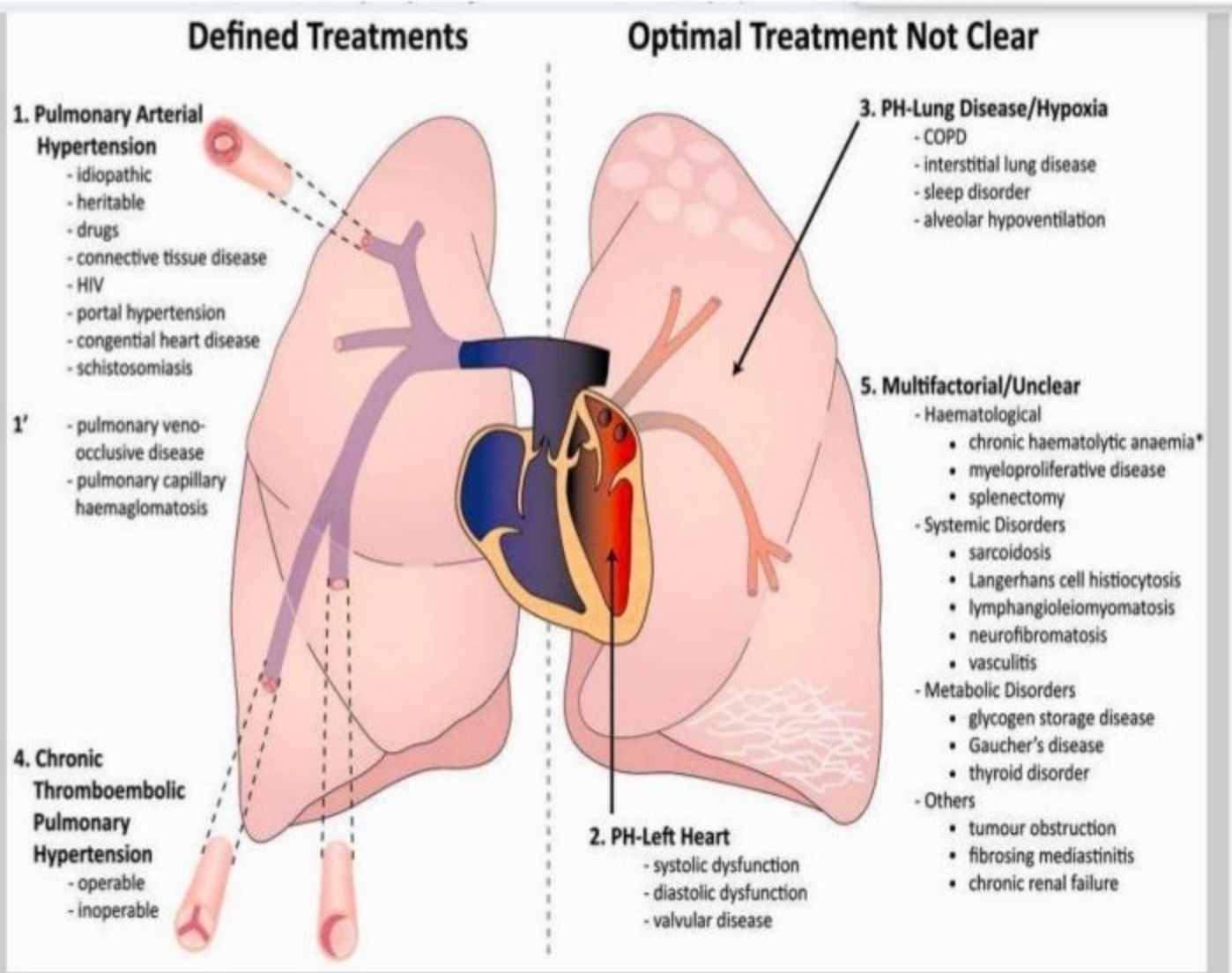
Group 1, pulmonary arterial hypertension (PAH);

Group 2, PH owing to left heart disease (PH-LHD);

Group 3, PH owing to lung disease and or hypoxia;

Group 4, chronic thromboembolic pulmonary hypertension (CTEPH) and

Group 5, unclear or multifactorial aetiologies



HOW DO I MAKE THE DIAGNOSIS?

- The majority of patients with PH who are pregnant will have an established diagnosis.
- However, this diagnosis should be considered in pregnant patients with increasing breathlessness in the first trimester, particularly if significant and associated with syncope.
- The classic symptoms of PH include fatigue and progressive exertional breathlessness. As the disease progresses, patients may develop exertional pre-syncope and syncope, which are usually indicators of severe disease.
- Exertional chest tightness similar to angina may occur but
- ankle oedema is a late feature.

Signs
Tachycardia
Elevated jugular venous pressure
Right ventricle heave
Loud P2
Pansystolic murmur from tricuspid regurgitation
Pulmonary diastolic murmur from pulmonary regurgitation
Hepatomegaly ± pulsation
Ascites
Peripheral edema

Investigations

- It is absolutely essential that if a diagnosis of PH is suspected, patients are referred to specialists experienced in the assessment of PH to confirm or refute the diagnosis.

- **Electrocardiogram (ECG) and chest X-ray** (CXR) may be abnormal in up to 90% of cases with severe disease but cannot be used in clinical practice to exclude PH.

- **Echo-**-The diagnosis is usually suggested by echocardiography--- mPAP of at least 25 mmHg, dilated right ventricle with reduced function and may identify a cause of PH such as LHD. In patients with IPAH, the sPAP is often in excess of 70 mmHg.

- **CT pulmonary angiography (CTPA**) performed for other reasons such as suspected pulmonary embolism.
- Review of the CT may show evidence of pulmonary artery enlargement and dilated right-sided chambers,

Investigation
Imaging
Chest X-ray
Ventilation perfusion scanning
Lung hypofractionated conformal radiotherapy
Contrast helical CT pulmonary arteries
Cardiac magnetic resonance imaging and angiography
Pulmonary
Pulmonary angiogram (in selected cases)
Arterial blood gases
Lung function
Nocturnal oxygen saturation monitoring
Exercise test (6-min walk/shuttle)
Cardiology
Electrocardiogram
Echocardiography
Cardiac catheterization
Cardiology blood
Routine hematology and biochemistry
Thrombophilia screen

risk of maternal death patient with P.H

- So the risk of maternal death remains very high.
- For those with severe P.H and poorly controlled disease, the risk will be significantly higher.
- Before2004,the mortality of P.H in pregnancy was estimated at 30–50%, but studies since then suggest that improved therapy may have reduced it to 20–30%.

Women with pulmonary arterial hypertension—irrespective of etiology—should be advised of the very high risks of pregnancy and be given **clear advice about contraception**

WHY IS THE RISK OF MATERNAL DEATH SO HIGH?

this is bcs of interplay between cardiovascular stresses with complex physiological changes occurring during pregnancy and the compromised right ventricular function and abnormal vasculature seen in these patients.

1. **increase Cardiovascular demands**
2. **Direct effects on the pulmonary vasculature**
3. **Acute changes in blood volume around delivery and effects on compromised right ventricular function.** The third stage of labour with delivery of the placenta and uterine contraction can release up to 500 ml of blood into the circulation.Delivery also results in decompression of the aorta and venous system, with an increase in venous return.
4. **Thrombosis**

5 Other factors

The stress of coping with a normal pregnancy is exacerbated in patients and their families by the presence of any medical condition where the risk of maternal death is high.

A number of issues may affect compliance, often with complex therapies and management plans. The need for assessments by experienced physicians able to understand subtle changes and a lack of randomised controlled trial data on how to manage these pregnancies contribute to a cocktail that may have disastrous consequences.

- **What forms of contraception can be used in patients with pulmonary hypertension?**
- Progesterone-only contraceptives (cerazette),
- nexplanon (implant) FOR 3 YEARS
- depot-provera (every 3 months)
- Nexplanon has the advantage that the individual does not need to remember daily medication or 3-monthly injections. These drugs can be taken in patients prescribed warfarin although care needs to be taken with intramuscular injections.

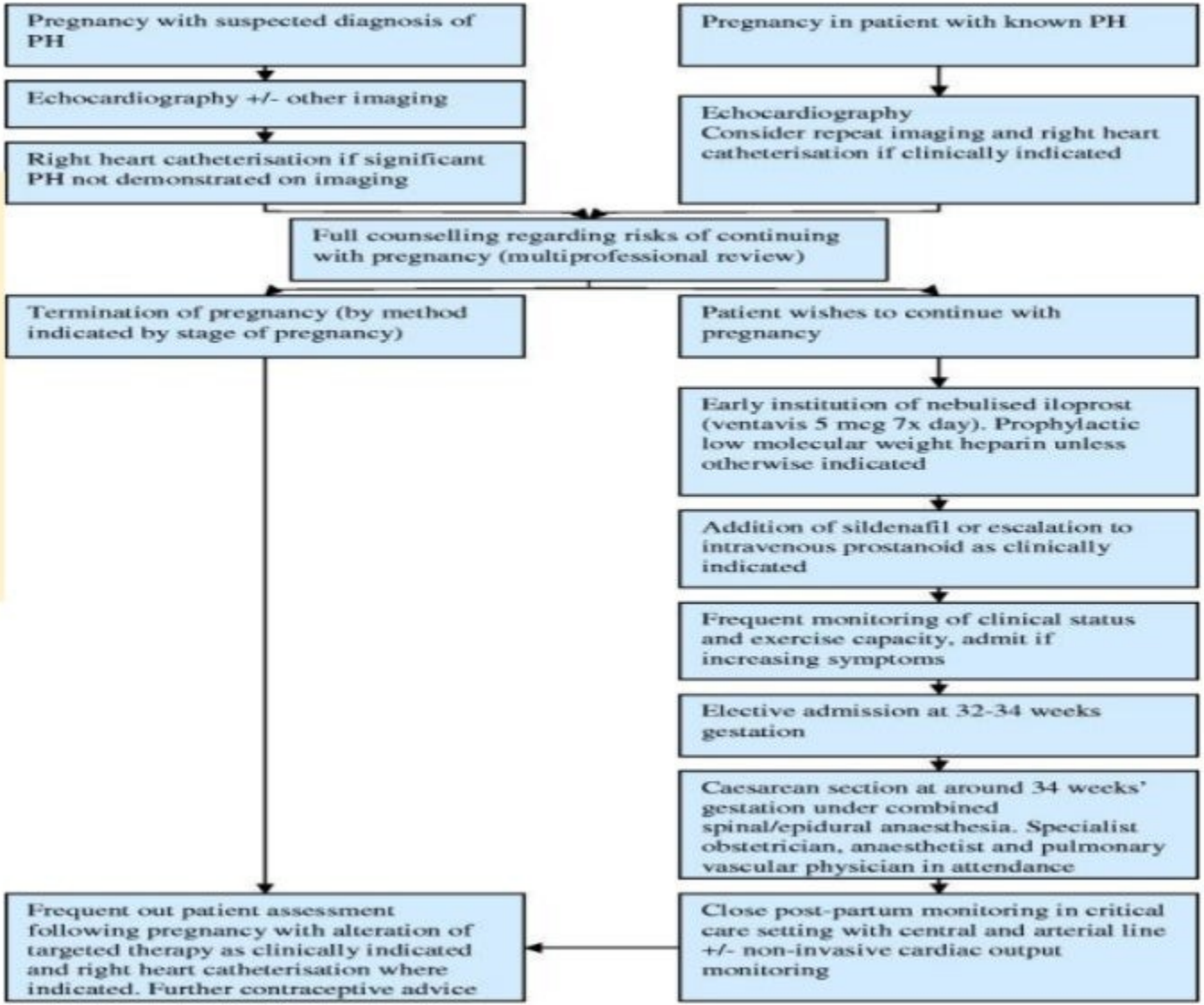
- The Mirena intra-uterine system is highly effective and helpful in women with heavy periods. The risk of vasovagal events, which can be dangerous in PH, mandates that these devices be inserted in a hospital.



- Periodic abstinence and condoms are not recommended as a sole form of contraception,
- . Female sterilization is generally not recommended as it requires an anesthetic although for appropriately counselled patients, it can be performed at the time of Caesarean section.
- Importantly the endothelin receptor blocker bosentan (but not ambrisentan) is an enzyme inducer so that for patients taking cerazette or nexplanon, we recommend an additional tablet of cerazette.
- Emergency hormonal contraception is safe for unprotected intercourse but a double dose is required in patients taking bosentan.



How should I manage a pregnant patient with pulmonary hypertension



When should I deliver a pt with pulmonary hypertension / TOD

- This is primarily dependent on the health of the mother and also the health of the foetus.
- deterioration in the first two trimesters is associated with a poor outcome and these patients require termination/delivery to save the life of the mother ·
- If the patient remains stable during pregnancy, there is an risks of premature Labour at a site distant from the specialist center, where the personnel and monitoring facilities may not be optimal so Our approach is to deliver at around 34 weeks .
- This will be influenced by the mother's previous obstetric history, progress in the current preg foetal growth, geographical issues and the wishes of the patient and their families.



What mode of delivery ? Vaginal delivery versus Caesarean section.

- **We recommend elective Caesarean section.**
- An elective procedure allows all members of MDT to be present at a time when circumstances are optimal and there is access to ICU beds for mother and neonate.
- It allows experienced surgeons to perform the procedure, minimizing blood loss and allowing maneuvers to avoid use of vasoactive drugs by use of bimanual compression and suture compression of the uterus as appropriate.
- MDT MEMBERS. a pulmonary vascular physician, two obstetric anaesthetists, two experienced obstetricians, a paediatrician, an intensivist, a midwife in addition to other members of the theatre team are all present.
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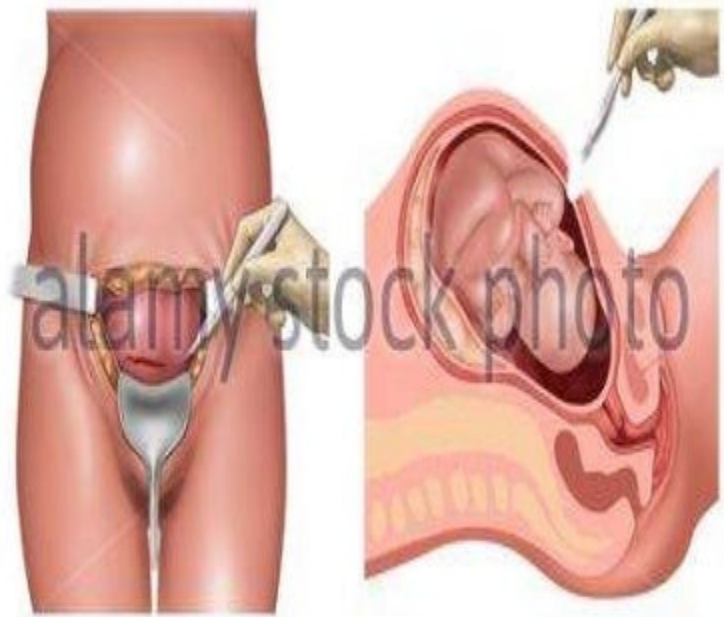


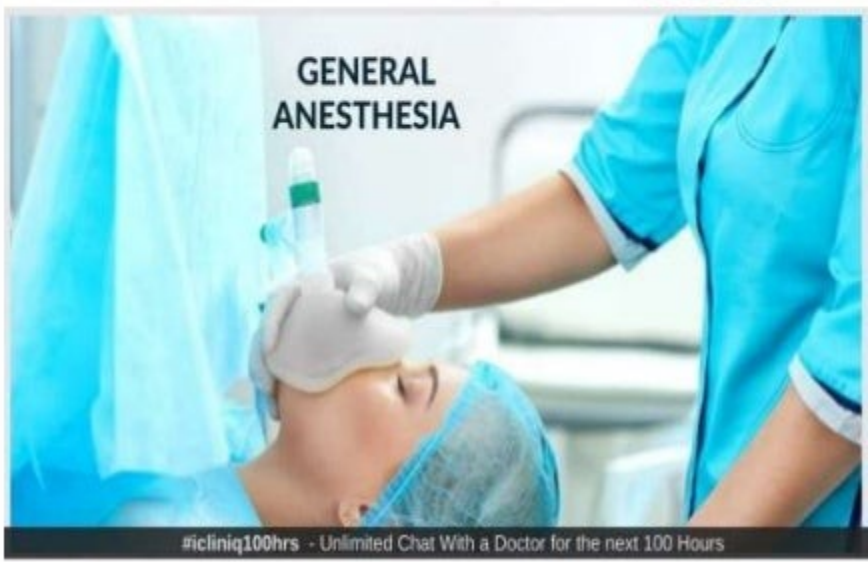
Vaginal delivery

- is advocated by some but this is accompanied by a 34% increase in cardiac output when the cervix is fully dilated.
- This can be ameliorated but not abolished by the use of regional anesthesia.
- Pushing in the second stage of pregnancy can significantly reduce cardiac output by reducing venous return to the right ventricle, which could have deleterious consequences.
- Given the trend towards pre-term delivery, induction of pregnancy could result in a long labour and the prospect of an emergency Caesarean section in this setting would be a significant undertaking



- **Regional versus general anaesthesia**
- Single shot spinal should be avoided, given the high risk of developing significant hypotension.
- Epidural anaesthesia and combined spinal-epidural anaesthesia are usually advocated, with the latter providing the advantages of a low spinal block with a denser sensory block than an epidural, but avoiding the risk of hypotension with a spinal.
- Regional anaesthesia also has the advantage of providing post-operative analgesia and importantly for patients with, for example bleeding complications, capacity for top up anaesthesia and ease of return to theatre.
- General anaesthesia has also been used successfully by a number of centres however, rises in pulmonary artery pressure are known to occur at tracheal intubation and positive pressure ventilation can have negative effects on venous return.





Are there any drugs I should use cautiously in patients with pulmonary hypertension?

- Anticoagulation is routinely prescribed out with pregnancy in patients with IPAH
- In pregnancy, the risks and benefits are discussed with individual patients.
- give prophylactic doses of LMWH in IPAH, full dose twice daily LMWH in CTEPH with prophylactic doses of LMWH given the night before surgery and the night after
- Oxytocic drugs can cause hypotension and tachycardia so give as a low-dose infusion of syntocinon at 5 units over 1 h, repeated as necessary..





How should I follow-up a patient following delivery?

- Patients are usually monitored in an ITU/HDU setting ------for 5–7 days and if stable, discharged shortly thereafter.
- stable patients are reviewed usually at
- 1 week,
- then fortnightly,
- then monthly,
- then 3 monthly.



IS BREAST FEEDING RECOMMENDED?

- There are no data on drugs used to treat PH and whether they cross into the breast milk.
- Due to uncertainty regarding this and the effects on a neonate, we advise against this.



CONCLUSION

- Patients with pulmonary hypertension should be advised of the high risks of pregnancy with clear and comprehensive contraceptive advice and if needed be offered termination of pregnancy.
- Despite being fully counselled regarding the high risk, patients may actively plan to become pregnant or may present for the first time in pregnancy with a new diagnosis of pulmonary hypertension.
- The advent of new therapies for specific forms of pulmonary hypertension, improvements in obstetric care and a multi-professional approach to the management has improved survival and outcome.
- Despite these advances, patients may have difficulties adhering to management plans and despite optimal strategies, pregnancy may ultimately result in the death of both the mother and unborn child.
- The potential impact that this has on family members and staff should not be underestimated.

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THANK YOU……