

This Viva relates to the respiratory changes of pregnancy at term, hypoxaemia and the foetal circulation.

Q 1. Describe the respiratory changes in pregnancy at term.

Subsequent questions sought a description of ABG at term pregnancy, physiological mechanism to explain an increased A-a gradient, causes of a low PaO₂ in a patient with a normal A-a gradient, the response of hypoxemia to supplemental O₂ when the A – a gradient is normal and when abnormal, and a description of the foetal circulation and the changes that occur at birth.

“Please give an example of a set of maternal ABGs at term”

pH	7.4 - 7.45 units	(7.40)
paO ₂	100-105 mmHg	(95)
pCO ₂	30-32 mmHg	(35)
HCO ₃	18-21 mmol/L	(24)

“What the the respiratory changes observed during pregnancy?”

mechanical

due to the effects of a gravid uterus,
increased effect at term
decreased FRC
reduced O₂ reserves

metabolic

higher basal metabolic rate
increased oxygen demands (20%)

cardiac

increased blood volume and cardiac output
decreased peripheral resistance

hormonal

due to the release of progesterone and estrogen throughout the pregnancy

“Why is there an increased A-a gradient?”

a - increases slightly due to increased ventilation and the decreased pCO₂ (Nunn - others unchanged)
A - increases more as the effect of the reduced pCO₂ is more significant $P_i - pCO_2/0.8$

“What is venous admixture?”

is the amount of venous blood that is needed to add to the arterial blood to compensate for the difference between ideal and actual O₂ content of the post capillary and arterial blood

“How would increasing the FiO₂ discern the difference between V/Q mismatch and shunt?”

Riley's three compartment model lumps parameters into dead space, ideal alveolus and shunt
in reality the shunt component is a combination of VQ mismatch and true shunt
treatment with high flow O₂ will tease out the difference, VQ mismatch will improve, shunt will not

“Describe the fetal circulation changes at birth”

it changes from parallel to in series due to changes in resistance
as the lungs inflate the PVR drops significantly and blood flows from the RV
when the umbilicus is clamped the placenta becomes higher resistance
LAP increases due to lung blood flow and the PFO closes
the ductus arteriosus constricts due to increased pO₂ and eventually fibroses