Pregnancy is characterized by progesterone-mediated hyperemia and edema of mucosal surfaces. This change is evident in the nasopharynx and oropharynx. and nasogastric tube size should be downsized. The diaphragm is displaced cephalad about 4 cm, and the lower chest wall widens about 5 to 7 cm. These changes peak at 37 weeks' gestation which is important if the patient requires a chest drain. When the diaphragm is pushed upward, the heart is rotated slightly to the left, which results in electrocardiographic changes of Q waves inferiorly along with and can be injured directly in blunt or penetrating trauma.

By 16 weeks' gestation, the glomerular filtration rate increases by 50% and Maternal blood volume increases progressively during pregnancy by about 2 L, or 30% to 50% more than the volume during the nongravid state. Maternal red cell mass increases only 20% to 30%, which results in hemodilution and the relative anemia of pregnancy.

As the uterus enlarges by about 20 weeks' gestation, the supine position may result in significant compression of the inferior vena cava, or supine hypotension syndrome. This uterine compression effectively may decrease venous return, resulting in a 20% to 30% decrease in ejection fraction. Lateral repositioning of can displace the uterus to the left, restoring cardiac output.

Blood pressure, especially the diastolic component, tends to be lower in pregnancy.

Physiological examination often reveals a systolic-ejection murmur and a third heart sound.

Echocardiography of normal pregnant patients demonstrates the following: (1) increases in all cardiac chamber dimensions, (2) increased left ventricular wall thickness, (3) small pericardial effusions, (4) mild tricuspid and pulmonic regurgitation in 90% of patients, and (5) mild mitral regurgitation in 30%.

The placenta serves the following three main functions: (1) respiratory and gas exchange, (2) nutrition for the fetus, and (3) waste elimination.

Maternal oxygen delivery to the placenta is affected by uterine artery blood flow, oxygen content of the uterine artery blood, and hemoglobin concentration and saturation.

Uterine blood flow at term is about 10% of cardiac output (600-700 mL/min), compared with 50 mL/min in the nonpregnant state.

Hypotension, uterine contractions, and vasoconstriction can decrease uterine blood flow. Vasoconstriction can be seen in preclampsia and with administration of the many inotropic support agents that commonly are used in the ICU. Ephedrine, which has predominantly b-adrenergic activity, is the vasopressor of choice for the treatment of hypotension in pregnancy.

In the setting of trauma-induced blood loss, the uterine artery vasoconstricts, which can precipitate fetal hypoxia despite relatively normal vital signs. Maternal blood flow is maintained at the expense of the fetus.

The fetus has many protective mechanisms to ensure its O2 extraction capacity: (i) The fetus has a higher hemoglobin concentration. (ii) Fetal hemoglobin is 80% to 90% saturated at a PaO2 of 30 to 35 mm Hg, whereas the major form of adult hemoglobin is only 30% saturated at this PaO2. This difference is a result of the leftward shift of the fetal oxygen dissociation curve. (iii) The fetus has the ductus arteriosus, which provides the fetus with two vortices to supply circulation.

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- At 12 weeks, the bladder becomes an abdominal structure and is susceptible to blunt trauma.

- At 20 weeks, the fundus of the uterus is at the level of the umbilicus and can be injured directly in blunt or penetrating trauma.

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- The change in minute ventilation is caused by an increase in tidal volume with little to no change in respiratory rate. This increase begins before the end of the first trimester and remains fairly constant during the remainder of the pregnancy.

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