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DEPARTMENT: BIOMEDICAL ENGINEERING

ASSIGNMENT QUESTION 2

Write a short note on ***IMPLANTATION***

ANSWER

WHAT IS IMPLANTATION?

Implantation can be defined as the stage of pregnancy or gestation (the period in which one or more offspring develops inside a woman) at which the embryo adheres or sticks to the wall of the uterus.

At this stage of prenatal development, the conceptus (the embryo in the uterus, especially during the early stages of pregnancy) is called a blastocyst. It is by this adhesion that the embryo receives oxygen and nutrients from the mother to enable its growth.

HOW DOES IMPLANTATION HAPPEN?

It should be noted that pregnancy is not a “one –step” process as many people assume. It involves tons of tiny but vital steps of which implantation is included.

After conception (i.e. the sperm and egg join), the combined cells begin to multiply fast and move through one of the fallopian tubes to the uterus. This cluster of rapidly growing cells is called a blastocyst (already highlighted above).

Once in your uterus, these tiny cluster of cells require implantation or attachment into your uterine wall. Hence, this is how IMPLANTATION occurs.

Implantation then triggers rising levels of pregnancy hormones such as estrogen, progesterone, and hCG, or human chorionic gonadotropin).

Without the occurrence of implantation, the lining of the uterus is shed into the usual monthly period.

However, when implantation does occur, the hormones of the woman will cause the placenta and the embryo to develop and her uterine lining will stay in place and support pregnancy.

WHEN DOES IMPLANTATION OCCUR?

If for instance, a woman has a twenty-eight-day menstrual cycle and ovulates on the 14th day, implantation would likely occur somewhere between day twenty and twenty-four of your cycle (which will be between six and twelve days after the egg is fertilized). However if she has a cycle which is longer than the previously stated, implantation would take place 6-12 days after ovulation and will occur between four to eight days.

It most commonly occurs 8 to 9 days after conception. Therefore, it can be summarized that the exact date of implantation depends on the period of ovulation and whether conception occurred early or late in the ovulation window.

A pregnancy that has implanted four days prior to the expected start of menstruation is just beginning to send signals to the woman's body in order to help in adjust to the pregnancy.

POSSIBLE SIGNS & SYMPTOMS OF IMPLANTATION

It should be noted that having the symptoms listed below doesn't necessarily mean a woman is pregnant and equivalently an absence of these symptoms doesn't necessarily mean a woman is not.

1. Implantation Bleeding

A majority of women do not experience any specific symptoms to indicate that implantation has occurred, but a small minority of women experience a phenomenon called implantation bleeding which happens around the time of implantation. Implantation bleeding usually involves only very light spotting but occasionally can be confused for a menstrual period because of the timing, or even a first-trimester miscarriage.

Most commonly though, it will occur a few days to a week before you expect your menstrual period.

But in order to differentiate implantation bleeding or menstrual bleeding, one can note that; implantation bleeding is most likely light pink or brown in color (as opposed to the bright or dark red of menstrual blood)

Also Implantation bleeding is more like spotting than an actual flow of blood.

This spotting may occur once, or last for a few hours, or even up to three days.

2. Cramps

It is a known fact that early stages of pregnancy causes a rapid shift of hormones. Especially implantation which is a trigger for the hormone surge

This being acknowledged, the changing hormonal tide can also cause cramping. Furthermore, there's a lot of activity in the uterus as the fertilized egg implants and begins to grow.

Although there is no research or proof that shows that implantation itself causes cramps, some women experience abdominal tenderness, lower back pain, or cramping around the time of implantation. This may seem like a mild version of how the cramps experience before menstrual flow begins.

3. Discharge

A woman may observe cervical mucus changes around the time of implantation.

During ovulation, the cervical mucus will be clear, stretchy, and slippery.

However, after implantation occurs, the mucus might have a thicker, stickier texture and be clear or white in color.

Especially in the days of early pregnancy, the rising levels in progesterone and estrogen may also cause the mucus to become even thicker, more profuse, and white or yellow in color.

It should however be noted that cervical mucus can be affected by a number of other factors such as hormones, stress, intercourse, pregnancy, implantation bleeding or period etc. and may not be a reliable indicator of whether or not implantation has occurred.

4. Bloating

An increase in the secretion of progesterone (which occurs in early pregnancy) slows your digestive system down. This can make a woman feel bloated.

However, this feeling is also a common symptom of one's period since Progesterone level also rises when your period is imminent.

5. Tender breasts

After implantation, hCG, estrogen, and progesterone levels rapidly increase. This can cause a woman to experience a feeling of soreness in her breasts.

Although many women also experience breast swelling or tenderness before their periods, this is likely more noticeable than usual in very early pregnancy.

6. Nausea

Arguably the most famous of the early pregnancy symptoms: nausea, often times referred to as “morning sickness” (though it can happen at any time of day).

Increased levels of progesterone following implantation can cause nausea. But again, this most commonly occurs around 4 or 5 weeks of pregnancy.

Progesterone slows down the digestion process, which can contribute to nausea. Rising hCG levels and a more sensitive sense of smell can make the problem.

7. Headaches

While the rise in hormone (especially progesterone) levels is good and essential for a successful pregnancy, they can also result in headaches following implantation.

8. Mood swings

Pregnant women are often times referred to as hormonal due to their continuous and sometimes sudden change in mood.

Estrogen and progesterone, as well as hCG, increase very quickly following implantation. This can make a pregnant woman feel moodier than usual. This symptom is also analogous with the menstrual flow.

9. Implantation dip

Implantation dip refers to a one-day decrease in a woman’s basal body temperature that can occur as a result of implantation.

Typically, a woman’s temperature is lower before ovulation, and then increases, and then drops again before her period starts. If she gets pregnant, her temperature remains elevated.

Some women however seem to experience a one-day drop in temperature around the time of implantation. This is different than the drop in temperature that means the coming of the menstrual flow (in the case of an imminent period, your temperature would stay low).

In the case of implantation dip, a woman's temperature drops for one day and then goes back up. It's thought that this might be due to a rise in estrogen, but it's not entirely understood.

According to an analysis of more than 100,000 BBT (Basal Body Temperature) charts from the popular app Fertility Friend, 75% of pregnant women using the app did not experience an implantation dip. Additionally, a dip was noted on approximately 11% of the charts of women who were not pregnant.

But it's pretty interesting that 23% of app users who turned out to be pregnant did have a so-called implantation dip.

This isn't a peer-reviewed, medically conducted study but it may be helpful when it comes to interpreting your BBT chart. An implantation dip is more likely if a woman is pregnant than if she is not, but a woman can absolutely still be pregnant without a dip.

SUMMARY

Occasionally implantation occurs outside of the uterus. This is considered an ectopic pregnancy. In fact, ectopic pregnancies are one of the leading causes of death in the first trimester, making them a huge problem. (Treatment can include medication, and/or surgery and it can also have ramifications in future pregnancies). An ectopic pregnancy is often called tubal pregnancy because many of these pregnancies occur in the Fallopian Tube. That said, some of these pregnancies also occur in places like the ovary, the abdomen, the cervix, and a few other places. Sadly, when the egg is not within the confines of the uterus, the pregnancy is certain to fail.