Course Name :An Overview on Maternal Health Antenatal, Intranatal and Postnatal Care

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Diagnosis of pregnancy - 1

Hello students. Welcome you all to the next session for the NPTEL online certified courses on the topic and overview on maternal health, the antenatal, intranatal and postnatal care. I am Dr. Barnali Ghosh, an obstetrician and gynecologist working as an assistant professor at B.C.Roy Medical College and Research Center, IIT Kharagpur. Today our topic of discussion is diagnosis of pregnancy. So, I have already talked about you know the patient coming on her missed period.

She comes the day when she misses her period, she comes to the clinic and you know whether she is pregnant or not, we go for the first test that is a urine pregnancy test right and that is by the Nishchai kit, the government supplied kit called the Nishchai kit or the kits which are available you know in the shops that is the Preganews, various UPT kits and on examination of the maternal urine you get two pink lines which says that yes she is pregnant. Now following the diagnosis of beta HCG in the maternal urine via the UPT kit, now we need to confirm pregnancy and this we can do you know depending upon the various symptoms which will be present in the mother trimester wise, first trimester up to 12 weeks there will be some symptoms following which there will be some other symptoms arising in the second trimester from 13 weeks to 28 weeks and some symptoms which will come in the third trimester from 29 weeks onwards. And we will also correlate with the symptoms as well as the signs of pregnancy which are to be evaluated by the clinician or the nursing staff attending the mother and depending upon these clinical signs we corroborate the pregnancy, we confirm the diagnosis of pregnancy and further confirmation is done with ultrasonography. So today our discussion will be diagnosis of pregnancy.

The concepts covered in this class will be the symptoms, the trimester wise symptoms appearing in the mother, the signs of pregnancy elicited by the obstetrician or the nursing staff attending the mother and ultimately the evaluation and you know confirmation of pregnancy by the ultrasound right. So the keywords are as follows signs, symptoms and evaluation of

pregnancy. Now coming to the history, you know the pregnancy we know that a female can be pregnant you know in her reproductive age group which is starting from the menarche, menarche til menopause within this period, within this reproductive period a female can become pregnant approximately 13 to 15 years you know 13 to 15 years up to 45 years of age right. So this is the reproductive age group. Here is the picture of Lina Medina in you know the in history she was the most youngest female to be pregnant right.

So she became pregnant at 9 years 7 months of age and the eldest pregnancy or the you know maximum age at which a female has become pregnant you know from the history it is approximately at 57 years. But as a whole during the reproductive age group a female can become pregnant that is starting from the menarche till her menopause. Now coming to the different diagnosis of pregnancy right. So we have already discussed number one are the symptoms, then trimester wise we will be discussing, then will be the signs and then ultimately the confirmatory USG features related to pregnancy. So in first trimester which is meaning from first to 12 weeks, this is the first trimester and what are the symptoms arising in the mother.

Number one is amenorrhea or cessation of menses. Yes she has come to you following her missed period so she has cessation of her cycles right amenorrhea. Number two is breast discomfort. Three is morning sickness. Number four increased frequency of micturition and ultimately a feeling of fatigue.

Now coming to one by one why there is amenorrhea because the progesterone, progesterone in the mother is present all throughout at a constant level. So there is progesterone excess, increased progesterone during pregnancy right. So during pregnancy the progesterone remains at a higher level all throughout. From where is the progesterone coming? For the first 6 to 8 weeks, first six to eight weeks this progesterone will be secreted by the corpus luteum. We have already discussed the corpus luteum will be secreting progesterone in a normal non pregnant female under the action of LH in the luteal phase up to day 21 of her cycle.

Following which the LH will decrease and corpus luteum will get disintegrated right. It will form corpus albicans and slowly the progesterone will be withdrawn from the mother's blood and there will be shedding of the endometrium in the form of menses. But if pregnancy has occurred then this corpus luteum will not get disintegrated. There will be corpus luteal rescue by the formation of HCG from the placenta. This HCG will help the corpus luteum to know continue its function and it will secrete progesterone for the first six to eight weeks.

Following which the placenta will be forming the progesterone in the later half of pregnancy then after eight weeks. After eight weeks eight to twelve weeks placenta will be forming this is called as the luteo placental shift where all the hormones which are required for the continuation of pregnancy are being secreted by the placenta. It was first being secreted from the corpus

luteum and then it will be taken care of by the placenta. This is called as luteoplacental shift and due to this progesterone there will be amenorrhea. Now you can tell me why no following delivery following the delivery there is progesterone will following say if it is this is up till pregnancy.

Now following delivery there will be abrupt decrease in progesterone. The progesterone levels will fall because now placenta is also getting separated following the delivery of the baby. So, after placenta is getting separated there is no source of progesterone inside the mother's body. So, there will be fall in progesterone. So, what happens there will be shedding of decidua.

What is decidua? It is nothing, but the endometrium during pregnancy. So, shedding of decidua in the form of I will write it here. Shedding of decidua so decidua rubra then decidua serosa and ultimately decidua albicans. So, the decidua of the uterine cavity will get shed off following delivery. Now there is a term called lactational amenorrhea.

So, we were concerned about amenorrhea during pregnancy which was due to increased levels of progesterone all throughout pregnancy. Now following the delivery of the baby there is also a period of amenorrhea during the lactation or breastfeeding period. And this lactational amenorrhea is due to increased prolactin secretion in the mother right. So, before pregnancy amenorrhea was due to progesterone levels in the mother and following the delivery the lactational amenorrhea is due to increase prolactin. Now coming to another sign called as the Hartmann's sign or placental sign.

What is it? So, we have already seen that the following the fertilization the zygote will get implanted in the decidua right. It will it is called as interstitial implantation. So, the zygote gets implanted in the decidua and say I take this color green. So, now this blastocyst actually implantation occurs in the form of blastocyst. This blastocyst will be covered on all sides by the decidua right.

So, this type of implantation is called as interstitial implantation which is seen in case of humans right. We have already discussed this in case of implantation. Now what are they this has you know divides the decidua into different names that is the decidua basalis, this is the decidua basalis, then the decidua parietalis sorry this is the decidua capsularis and this is the decidua parietalis. And this space this is the decidual space this is the decidual space which is present in the first half of pregnancy. Slowly the embryo will increase in size it will go on increasing in size and this decidua capsularis will gradually slowly it will be you know also going towards the decidua parietalis and a time will come when this decidua parietalis will you know get attached or fuse with the decidua capsularis obliterating the decidual space.

So, theoretically till the decidual space is you know still present it is present till 16 weeks

following 16 weeks of pregnancy the decidual space will get obliterated. So, till the decidual space is still patent there is a chance of you know bleeding, bleeding from the this decidua. As the space is still patent the decidua capsularis and parietalis may sometimes undergo changes which will cause endometrial shedding or decidual shedding causing a type of bleeding even during even if she is pregnant there will be history that she is having bleeding you know and she may misdiagnose it as a menstrual bleeding. But this is called as Hartmann's sign or placental sign and it occurs up till 16 weeks then there will be obliteration of this decidual space and there will be no shedding of decidua right. So, do you get this point this placental sign has no correlation with placenta it is only the menstrual type bleeding which is occurring from the decidua covering the patent decidual space in the first 16 weeks of pregnancy.

And after 16 weeks when this decidual space gets obliterated by the enlarging embryo leading to fusion of decidua capsularis and parietalis thereby following 16 weeks there will be no shedding of any further decidua and the Hartman sign and placental sign will now not be present right. So, this is you know very rare only theoretical discussion that this can happen. Now coming to the next symptom that is morning sickness which is due to the rising levels of HCG. We know HCG is being produced from the syncytiotrophoblast of the developing placenta. Now chorionic villi part the fetal part of placenta will be secreting HCG and lead to morning sickness which is nothing, but nausea and vomiting feeling of nausea and vomiting right.

So, the HCG levels we have also discussed in the hormones of pregnancy the levels of HCG they start to be present in the maternal serum from day 8 of fertilization that is day 22 of her cycle and it will go on increasing right. So, this morning sickness will know mimic the levels of HCG in the it will start as early as 5 to 6 weeks of gestation there is feeling of nausea and vomiting and gradually increases becomes maximum at around 10 weeks HCG levels are maximum we have discussed around 60 days right 60 to 70 days which is 8 to 10 weeks. So, HCG levels are also highest at this duration 10 weeks. So, at that point morning sickness is also highest and gradually it subsides around 16 weeks of gestation following which morning sickness goes away, but to note that you know approximately 15 to 20 percent of women 15 to 20 percent of women may complain of morning sickness even till third trimester right and in 5 percent of pregnant women it is present till delivery otherwise it will go away by 16 weeks of gestation right. Now coming to frequency increased frequency of micturition in the first trimester why does it occur because of the anteverted uterus which is pregnant which is gravid right pregnant or gravid uterus now it is slowly slowly increasing in weight increasing in volume.

So, see this is the bladder this is the bladder and here say this is the uterus, uterus is and diverted and it is you know over the dome or fundus of the bladder. So, this is the uterus now here is the gestational sac. Now, slowly this with increase in gestational age this uterus will become heavy and this uterus will be pressing on the fundus of the bladder and this will cause

you know more irritation also decrease in you know residual volume the capacity of the bladder will also decrease and you know slight amount of urine accumulation in the bladder will elicit a sense of micturition. So, there is increased frequency of micturition. Now, see as the pregnancy continues this uterus will gradually gradually enlarge in size and from the anteverted position it will become you know straight it will go straight and it will now become an abdominal organ.

So, this was pelvis this was the pelvis and this is the abdomen. Now, slowly slowly this uterus will increase in its you know size and from the ante-verted position here is the bladder it was resting like this it will slowly slowly you know increase in size and from the anteverted it becomes erect its straight position and then it come from the pelvic organ it becomes now an abdominal organ you know after crossing the pelvic bone or pelvic inlet. So, it becomes an abdominal organ by 12 weeks. So, when this becomes straight the pressure on the bladder will go away. So, this frequency of micturition will go away.

So, duration of this symptom will be 8 to 12 weeks after 12 weeks it will go away right. Next coming to the breast discomfort why does it occur due to vascular engorgement. The vessels underlying the skin of the breast will go will increase in their caliber there will be increase in vascularity and thus leading to a feeling of fullness also some pricking sensation. It starts from as early as 6 weeks of gestation and it is more common in case of primary gravida right. So, these are all the changes that occurs in the first trimester.

In breast examination what you will find in first trimester it becomes fuller they may become tender on touch or pressure the areola slowly slowly there is darkening of the areola due to pigmentation which is due to increase in melanocytes stimulating hormone due to increase in estrogen and progesterone and the veins underneath the skin of the breast sometimes may become visible right. So, coming to the symptoms have we have covered now coming to the examination part or the signs in first trimester. Per vaginal examination, per vaginal examination we rarely do in first trimester, but to know that the size of uterus gradually increases and starting from 6 weeks the size is comparable to a hen's egg at 8 weeks like that of a cricket ball and at 12 weeks it is comparable to the fetal head right. So, uterus non pregnant uterus is pare form in shape we know we have already discussed the you know dimensions of uterus 3 into 2 into 1 inches right. So, that is non pregnant in non pregnant state.

Now, in pregnant state the uterus becomes globular in shape and it increase in size by 1 centimeter per week both following hyperplasia and hypertrophy right. Now, coming to the different signs of pregnancy. So, you know number 1 are due to the softening softening why because there is increased progesterone which causes softening water accumulation and you know the different parts of the uterus they become soft and more flexible right. So, number 1 is softening then number 2 is increased vascularity also due to the vasodilatation the peripheral vascular resistance decreases and there is increased vascularity 2 of the vessels supplying the

uterus and some occasional contraction of the myometrium may occur, but it does not happen in the continuation of pregnancy we will come to them one by one. Now, I will draw a picture here for you see this is the uterus right.

And, now you know first point we have discussed is softening. So, say this is the cervix then is the isthmus and this is the body. So, what is happening? Firstly, there is softening of this cervix the cervix is soft and this softening of the cervix is called as goodell sign right which is softening of cervix. You can palpate in first trimester if you go for a vaginal you know vaginal examination per vaginal examination we can appreciate that the cervix the lips of the cervix which were like comparable to the cartilage of the nose in non pregnant state it was like that hardness the cartilage of the nose that hardness is similar to the lips of the cervix anterior and posterior lips, but in pregnancy they become soft and they become that of the lips the lips the lips are soft. So, their consistency is comparable to the lips right.

So, that is called as goodell sign and it is elicited around 8 weeks. Number 2 is softening of the isthmus it is called as Hegar's sign this is nothing, but softening of the isthmus right and this can be elicited by 6 weeks. Next coming to softening of the fundus softening of the fundus is called as Von-fernwaldt and this is softening of the fundus of the uterus. Another thing we have noted that the placenta, placenta is maximum times is lateral in implantation right. So, it is attached to the lateral wall of the uterus and you know at the site of the attachment there is asymmetrical enlargement asymmetrical enlargement of the site of the wall on where is the site of attachment of the placenta right and that sign is called as piskacek's sign piskacek's sign right.

So, this is the your piskacek's sign which compared to the other wall to the opposite wall the this wall has you know increased enlargement due to the implantation of the placenta right. So, these are all the signs due to softening these this side are due to another sign yes very important one is this midpoint of the isthmus. This is the isthmus I have told this is the cervix. Now, midpoint of the isthmus this is the maximum you know most softest part among all the parts on the uterus and this is called as the laden sign or the Ladin's point right. Another thing is due to this softening of the isthmus the isthmus becomes very flexible the uterus can move you know at the level of the isthmus this isthmus is very soft and it has become flexible.

This is called as McDonald's sign McDonald's sign is due to increased flexibility of isthmus. Right. So, these are all the softening signs. Now, coming to the vascularity increase in vascularity these are the uterine arteries which have become very vascular and due to this we can feel pulsations at the lateral furnaces of the vagina which is called as osiander's sign. This is also elicited around 8 weeks of gestation right.

Another thing is the vessels the blood vessels which are present underneath the cervix and the vaginal epithelium. These blood vessels will also become you know engorged there will be more

blood in these blood vessels supplying the cervix and the vagina giving the vagina and the cervix a bluish hue a purplish hue right. And this is called as the jacquemier or the Chadwick sign. So, these are due to increase in vascularity right. Another important point to note here is you know sudden not rhythmic, unrhythmic, sporadic you know painless contractions and they are irregular, unpredictable, but they the pressure the contraction they remain between 5 to 25 millimeter of Hg and this can be elicited by per vaginal examination as early as 4 weeks.

And this is called as Palmer sign. This is a per vaginal examination sign and this ultimately becomes the Braxton Hicks contraction during the second trimester right. And they can be felt by the mother as some sporadic, unpredictable, non rhythmic, painless contractions you know feeling like the tightening of the lower abdomen and they vary from 5 to 25 millimeter of Hg not more than that they are not associated with cervical dilatation, not associated with labor and they are present or can be perceived by the mother from the second trimester. So, these are regarding the signs in pregnancy. We have all discussed the softening signs, then the vascularity signs and contraction signs that is the Palmer sign which can be as early as 4 weeks of gestation.

Now, see how to see the Hegar's sign. Hegar's sign I have told softening of the isthmus is called as the Hegars's sign. So, in per vaginal examination you are putting your fingers through the vagina and another hand over the abdomen and now you can oppose these two fingers of these two hands because thus isthmus in between this is the isthmus and this isthmus is very soft and you can oppose the fingers the anterior and posterior fingers right. So, this is occurs only in case of pregnant uterus and it is seen by 6 weeks of gestation right. Now, this is the McDonald sign also I have told that yes the isthmus at the level of isthmus the uterus becomes highly flexible and now during examination you can see you can move the uterus at the level of isthmus.

So, this is called as the McDonald sign. This is also due to softening of the isthmus. Jaquemers sign yes this is a colposcopy view or now par speculum view just par speculum view when you view the vagina and the cervix you see this bluish this is bluish or purplish in color this is the cervix which has become bluish you know actually they are more reddish or pinkish. In pregnancy the both the vaginal walls and the cervical epithelium they have turned to be bluish right. So, this is called as the Jaquemier's or Chadwick sign and this is due to increased vascularity. Now, first trimester we have completed coming to the second trimester which is from 13 to 28 weeks.

So, what are the symptoms? Yes, amenorrhea persists all the other symptoms that is the morning sickness, the nausea, vomiting, the breast discomfort, the frequency of micturition they gradually gradually go away right. So, enlargement of the abdomen slowly slowly gradual enlargement of the abdomen occurs there is growth of the fetus. Number 2 quickening what is quickening? Quickening is perception of fetal movements by the mother right. So, in mother the

perception of fetal movement first perception of fetal movement is around 16 weeks of gestation this is in case sorry 18 weeks 18 weeks of gestation in case of primigravida first time mother. In case of multigravida they are already experienced they know the symptoms of pregnancy the changes occurring in the mother's body as they had a previous pregnancy.

So, they will perceive the fetal movement a little earlier 2 weeks earlier at 16 weeks this is in case of multigravida right. Now, coming to Braxton Hicks contraction yes we have discussed that these are non rhythmic sporadic you know painless you know contractions occurring and they are not related to labor, they are not related to cervical dilatation and they continue through the pregnancy they have you know their contraction measurement will be within 5 to 25 millimeter of Hg not more than that right and they are perceived by the mother from the second trimester. Another thing is the pigmentation pigmentation due to increase in melanocyte stimulating hormone and there will be pigmentation of the abdominal skin in the form of linear Niagara and stria gravidarum and Chloasma which is pigmentation of the chicks and around the eyes all these will go away following the delivery of the fetus. So, we have seen the symptoms now coming to the examination point or the signs in inspection we will see the linear Niagara and the stria gravidarum in palpation we will palpate the fundal height the Braxton Hicks contraction can be palpated by the examiner by putting her hand over the abdomen on the pregnant uterus and also we can elicit ballotment we will come to them one by one and lastly on auscultation we can hear the fetal heart sound right. So, first coming to the inspection the skin changes this is the linear Niagara this extends from the Xiphisternum up to the Symphysis pubis this is the Symphysis pubis this is the Xiphisternum and it is extends it is a midline you know hyper pigmented line extending from the Xiphisternum to the Symphysis pubis and these are the stria the on the lateral abdominal wall we can see pink or pigmented layers these are the stria gravidarum and these are due to this present pregnancy say she had a previous pregnancy this stria will ultimately after the delivery they will become silvery white and they are known as striae albicans which are due to the previous pregnancy right.

So, these are the skin changes now coming to the breast changes also over the breast there will be increase in pigmentation the areola areola will be heavily pigmented and also increase in pigmentation number 1 number 2 is Montgomery tubercles these are the modified sebaceous gland which undergo you know hypertrophy and they will be present as Montgomery tubercles another is you know important point is the secondary areola which is at the periphery of the primary areola this is the pigmented now lesser pigmented than the primary areola this is called as the secondary areola it arises around 20 weeks of pregnancy and sometimes there is you know discharge from the nipple in the form of colostrum as early as 12 weeks right. So, these are the breast changes now coming to the fundal height examination per abdomen right slowly the height of the uterus will go on increasing after 12 weeks the uterus is a pelvic organ from 12 weeks the uterus will start to you know increase and will become an abdominal organ and you can palpate the uterus you know just from the end of the 12 weeks now see if here is the

umbilicus this is the umbilicus. So, this is the symphysis pubis we will again read the you know this fundal height examination in the third trimester examination, but to start with at the level of umbilicus the gestational weeks is 24 weeks at xiphisternum it is 36 weeks and in between these areas are of four finger breadth we have divided this know for our convenience to from clinical point of view on examination we can assess the weeks of pregnancy by seeing the fundal height right. So, from 12 weeks it will be 16 weeks 20 weeks and 24 weeks the fundus of the uterus will be at the level of thumb like us then 24 then after that 28 32 and at 36 weeks it will be at the level of xiphisternum right. So, these are you know and after that 40 weeks the uterus will somewhat go down and come at the level of 32 weeks 32 and 40 weeks are at the same level right.

So, this you know from this fundal height measurement we can assess the gestational age right. Now, another thing to you know I wanted to include here is the internal ballotment. Now, ballotment is also elicited in second trimester coming to internal ballotment. So, see how to remember this I meaning 1 and B you know somewhat if you can write it B like 6. So, from 16 weeks internal ballotment can be elicited up to 28 weeks first number you add 1 and second number you add 2.

So, it comes out as 28. So, within 16 to 28 weeks we can elicit internal ballotment how to elicit it just putting a finger per vaginal you push the you push it from below through the per vaginal finger and following that you give a pressure you give a pressure and after that that finger you can palpate you know the fetal head again hitting the per vaginal finger right. So, this is ballottement. So, what is the inference if internal ballotment is positive what is the inference number 1 Likert is adequate right. Number 2 presentation it is cephalic or longitudinal presentation we will come to this presentation, but as of now to note that presentation can be longitudinal can be transverse can be oblique. When the fetus lies along the long axis of the uterus of the mother it is called as the longitudinal presentation and a internal ballotment can be elicited only in case of longitudinal alignment of the fetus.

So, this is that is only in case of longitudinal presentation and third is yes there is a fetus inside right in some cases of molar pregnancy when there was no fetus fetal tissue only chorionic tissue is present in that case internal ballotment cannot be elicited. Another thing is the external ballotment external ballotment you know from outside of keeping the hand on the abdomen this is external ballotment here also same you know ballotment this is also same with this hand you give a pressure and this hand will perceive the fetus you know striking the other hand. So, this is also called as external ballotment and it can be elicited from 20 weeks of gestation right. So, these are the examination or signs and lastly on auscultation auscultation you can hear the fetal heart sounds by the stethoscope right stethoscope or Pinard's fetoscope from 20 weeks from 20 weeks you can hear the fetal heart sound and with this Doppler handheld Doppler handheld Doppler has an advantage because this can you know measure the fetal heart sound from as

early as 10 weeks of gestation right. So, this handheld Doppler you put it over the symphysis pubis in just press a bit because at 12 weeks the uterus is at the level of symphysis pubis at 10 weeks it will be slightly below.

So, at the level of symphysis pubis you put the Doppler and you press a bit inside the pelvis of the mother and you can collect you know you can record the fetal heart sound as early as 10 weeks of gestation right. So, this was regarding the auscultation and you know more confirmation of pregnancy can be done with ultrasonography and first trimester ultrasonography we will discuss in the subsequent class what are the things to be noted, how to confirm, how to calculate the gestational age right we will discuss them in the ultrasound chapter. Now, the third trimester changes in pregnancy we will discuss in the next class as of now this was regarding first and second trimester signs symptoms of pregnancy and evaluation. References of today's class has been taken from the D.C.Dutta book of obstetrics, the Williams obstetrics and the James book on high-risk pregnancy. So, thank you for today you know wishing you all a very good luck and keep reading keep taking notes. Thank you.