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

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Diagnosis of Pregnancy 2

Good morning students. I welcome you all to the NPTEL online certified courses on the topic, an 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 Medical Research Center, IIT Kharagpur. Today, our topic of discussion is the continuation of the previous class regarding the diagnosis of pregnancy. In the previous class, we have discussed the first trimester, pregnancy, signs and symptoms.

In the first trimester, the symptoms being those of morning sickness or nausea and vomiting, increased frequency of micturition. In the very first is delayed menses or amenorrhea and also different breast discomfort and fatigue. Signs coming to be the one that were due to increased in vascularity of the uterus as well as some signs which were due to the softening of the various parts of the uterus. Moving on to the second trimester, we discussed the symptoms.

You know most of the symptoms of first trimester will go away after 16 weeks except the amenorrhea which persists and from second trimester, there will be quickening or perception of fetal movements by the mother and also there will be gradual enlargement of the abdomen due to the enlarging uterus and palpation of fetal parts and auscultation of fetal heart sound starts from second trimester. Today we will continue our discussion with the third trimester, right. So for today's class, we will concentrate on third trimester which is starting from your 29 weeks. So third trimester is starting from 29 weeks onwards, right. So what are the symptoms? Number one, enlargement.

Amenorrhea persists and there is also no more enlargement of the abdomen due to the increase in the fundal height of the uterus, right. Number two, fetal movements. Fetal movement perception by the mother is, you know, it is a very important criteria regarding the fetal well-being assessment in the antenatal period and the mother should be educated regarding counting the fetal movements. In case the fetal movement count decreases or the mother cannot perceive the movement for a considerable duration of time, then she must do certain steps, right. Number one, she needs to take some rest in the left lateral position.

She needs to hydrate herself with say one or two glasses of glucose water. She needs to relax in a relaxing environment and then she will, you know, count the fetal movement. Then also she cannot perceive the fetal movements, then she should report to her doctor immediately for screening and, you know, fetal assessment, right. Now third symptom which again reappears in third trimester is the frequency of micturition. In the first trimester, it was due to the uterus, the ante-verted uterus which was pressing on the bladder, thereby uterus becoming more gravid, pressing on the bladder and, you know, there will be increased frequency of micturition.

Then after 12 weeks when the uterus becomes straight upright and it becomes an abdominal organ from the pelvic organ, then that pressure on the fundus of the bladder goes away and so the frequency of micturition, this symptom will, you know, go away in the second trimester. In the third trimester, again as the fetal head, now the fetus is, you know, large enough and in the late third trimester, there will be gradual descent of the fetal head into the maternal pelvis which will again compress the bladder, thereby leading to frequency of micturition. Next is respiratory discomfort. Yes, the uterus is growing in size. It will, you know, gradually, gradually at around 36 weeks, it will touch the xiphisternum and this increased height of the uterus will cause the diaphragm to elevate by 4 centimeters.

We have read it regarding the respiratory system changes in, you know, physiological changes of pregnancy. So, the diaphragm will get elevated by the enlarging uterus and there will be respiratory discomfort. The uterus, the gravid uterus will again compress on the stomach and there will be, you know, different types of indigestion and discomfort for the mother which is maximum at around 36 weeks. This discomfort goes away and this is called as lightening, right. From 36 weeks, the fundal height will decrease, right, to 40 weeks because the fetus goes down.

So, this discomfort will relatively go away and that is called as lightening which is also a welcome sign, right. So, these are regarding the symptoms. Now coming to the signs, very, very important part of examination in the third trimester is the symphysio-fundal height, right, because it is important because we get an estimation of the gestational age from the symphysio-fundal height, right. So, form an examination point of view, every system while you examine a patient, here we are examining a mother, she is not a patient, right, but the protocol remains the same starting from the consciousness, alert conscious, cooperative, whether she is alert conscious or cooperative number one. Then the general examination from head to toe that is the pallor, then the cyanosis, jaundice, right, skin color, right, then pulse, BP measurement, weight measurement, all will be done in sequential manner, right.

Then coming to the obstetrical examination, obstetrical examination we divide it into three parts, number one is inspection. Inspection is your inspection of the abdomen regarding the, you know, avoid swelling of the abdomen, the skin overlying the abdomen, any stretch mark or any

hyper pigmented lines like linea nigra, then presence of any scar mark, scar mark pertaining to previous surgery, previous history of cesarean section or any gynecological surgery should be taken into account, right, from the inspection. Then there may be certain, you know, skin diseases which you can evaluate from inspection by just looking at the skin, whether there is any ringworm infection, whether there is, you know, any spider navi, increased vascularity, you know, so there will be spider navy or vascular changes underlying the skin. So, all these should be taken into account in inspection. Number two is palpation, right, which in palpation we go for the fundal height examination and number three is auscultation.

There is no percussion here, auscultation that is fetal heart sound auscultation, right. So, coming to the palpation part, so fundal height, now we will be discussing regarding the fundal height, how to go for this examination. Number one, the uterus, this hand, this is the right hand of the examiner. So, the examiner is always towards the right side of the mother. Mother is lying down in a supine position and the examiner on the right side puts her right hand, you know, just to centralize the uterus.

So, this is the abdomen, so uterus is like this and we know in pregnancy, uterus is somewhat dextro-rotated, that is it is tilted towards the right side. So, this right hand will help to centralize this uterus. Now the uterus is centralized, the long axis of the uterus is parallel to the maternal spine and then with the left hand, we start from the xiphisternum of the mother and we go slowly downwards and the first resistance which is felt by this ulnar border of the left hand, the first resistance, this is the ulnar border, I do it with a different color. So, this is the ulnar border of the left hand and the first resistance felt by this left hand, this gives the fundal height. With a marker pen, we just put a mark over here and this is the fundal height, right.

So, this is how we are examining the mother is in supine position, you need to expose the mother from xiphisternum to the mid thigh, but for privacy, we know just keep the internal genitalia all covered and now with the left hand just like from xiphisternum, we can come down, down, down and here we feel the first resistance and this is the fundal height, this is the fundal height, right. Now talking about what is the inference from the fundal height, right. In the last class, I did have a discussion, this fundal height, we start measuring the fundal height, you know from the second trimester itself, the uterus becomes an abdominal organ say from 12 weeks of gestation, right. So, this is three bony points, this is the pubic symphysis and above here is the xiphisternum, xiphisternum and in the middle somewhere here is in between these two points is the umbilicus, right. So, now at the level of pubic symphysis, the uterus the fundus of the uterus reaches the level of pubic symphysis at 12 weeks of gestation.

So, till 12 weeks the uterus cannot be palpated per abdomen, it is still a pelvic organ, right. So, after 12 weeks it just becomes an abdominal organ and you can palpate the uterus by per abdominal examination. Say it uterus becomes mostly you know more easily palpable from 14

weeks, right. Now there will be gradual enlargement of the uterus as time goes, as gestational age increases the uterus also grows. Now what we have done, we have taken a four finger breadth distance from this pubic symphysis, right.

So, this is now thus this four finger breadth distance will be dividing this segment from the symphysis pubic symphysis, right. So, this is the junction of upper 2/3rd and lower 1/3rd. This corresponds to 16 weeks of gestation. Next level that is the junction of upper one third and lower two third of the distance between the umbilicus and the symphysis pubis corresponds to 20 weeks of gestation. When the fundus of the uterus reaches the umbilicus it corresponds to 24 weeks of gestation, right.

Some in some textbooks it is written that at the lower border of the umbilicus it is 22 weeks and upper border is at 24 weeks. But you know it is difficult lower border of the umbilicus. This is very small distance we cannot differentiate very easily. So, we take as a whole at the level of umbilicus the uterine fundal height corresponds to 24 weeks of gestation. Now after 24 weeks we again divide this segment we again divide this segment into four finger breadth distance and into three parts this segment between the xiphisternum and the umbilicus. So, the first segment will correspond to 28 weeks then to 32 weeks and at the xiphisternum the uterus reaches at 36 weeks of gestation, right.

Now what happens after 36 weeks? Yes because there is decrease you know descent of the fetal head into the maternal pelvis mostly you know in primi gravida after 36 weeks say around 38 weeks mostly there is a lot of engagement, right. The maximum transverse diameter crosses the pelvic inlet. So, with engagement there is descent of the fetus down and the fundal height will also go down. So, what happens? So, the uterus will go down and say it becomes like this it comes down from 36 weeks it comes down. So, this is at 40 weeks, right.

At 40 weeks the uterus comes down and it you know corresponds to the 32 weeks size, right. So, at 40 weeks at 40 weeks the uterus will come down. So, at 40 weeks the uterus will come down. So, at 40 weeks the size of the the fundal height corresponds to 32 weeks fundal height at the same level. Now what difference is there? Number 2 the fundus which was still now it was like globular in shape it was globular at 40 weeks the fundus becomes flat, right.

It will become flat shelf like and just you know you can keep a cup of tea on the fundus it becomes flat. So, this is called as shelving sign. Third is the flanks. The flanks will be full flanks will be full in 40 weeks. So, the flanks will be full in 40 weeks uterus and another sign which I have already mentioned that due to descent of this fundal height the compression on the diaphragm goes away compression on the stomach goes away and there will be a relief a sense of comfort a relief from you know these compressions relief from discomfort on the part of the mother, right.

So, this is also called as a welcome sign. So, these will all be present in a 40 weeks uterus, right. So, by this you can from the estimation of the fundal height say this is your this is 12 weeks sorry this is 12 weeks 12 weeks it is just at the level of the symphysis at the upper border of the symphysis pubis and gradually 16 weeks 20 weeks here is the umbilicus. So, 24 weeks right then 28, 32, 36 at the xiphisternum and then again at 40 weeks. So, in 30 weeks the fundus comes down, but there will be fullness in the flanks and also the presence of the shelving sign which becomes the fundus becoming flat shelf like.

So, all this helps in estimation of the gestational age very important right you know from clinically we can get an assessment right from about the gestational age. So, this is no already discussed that at 40 weeks it is 32 weeks fundal height there is sudden relief from discomfort on the part of the mother which is called as lightening or a welcome sign and the fundus the upper the upper level of the fundus of the uterus it becomes flat from globular shelf. Now, globulars shape like a shelf which is called as the shelving sign and the flanks are full right this is how you differentiate from a 40 weeks uterus and a 32 weeks uterus. Now, coming to the symphysiofundal height measurement you have got the fundal height from the examination right and you place a you know a with a pen or a marker you just put a point on that fundal height. Now, with a measuring tape with a measuring tape you know inch tape you measure from the symphysis pubis from the symphysis pubis up to the fundus.

So, this length is the symphysiofundal height right. Now, what to infer or what to know what knowledge we get from the symphysiofundal height? The symphysiofundal height from 24 weeks onwards that is after the uterine fundus reaches the umbilicus from 24 weeks onwards the symphysio fundal height in centimeter will correspond to the gestational age in weeks right. So, say at 24 weeks the fundus is here. Now, you from the symphysis pubis the symphysio fundal height will correspond to 24 centimeter. Then, so, up to 36 weeks this is the xiphisternum.

So, up to 36 weeks. So, uterus grows grows grows and say you from 24 weeks onwards whatever be the fundal height whatever you measure the fundal height say here now after 1 month she has come to you and you place the measuring tape and you see that yes it is at 28 centimeter. So, this symphysio fundal height which you have measured in centimeter this will correspond to the gestational age 28 centimeter meaning 28 weeks of gestation right. So, from the fundal height you directly get the gestational age. Now, what is the significance? What is the significance of this symphysio fundal height? Say at 26 weeks I have already told from 24 weeks it will collaborate to the gestational age. So, when the gestational age is 26 weeks the symphysiofundal height measured by the measuring tape in centimeter will come to be 26 centimeter.

A little amount of variation of plus minus 2 centimeter is allowable you can allow it may

happen plus minus 2 centimeter here and this way can happen, but say this you get the symphysio fundal height as 30 centimeter. So, it is more than the plus 2 range. So, what is the inference? At 26 weeks you get the symphysiofundal height as 30 centimeter which is meaning that the symphysiofundal height is more than the period of amenorrhea. What are the inferences you can deduce? Number 1 is wrong date. Maybe she has told her LMP you know she has mistaken her LMP and you calculated the gestational age from her LMP.

So, which is erroneous right. So, first cause is wrong date and you need to reevaluate her LMP by asking her by following her you know you need to tell her you need to recollect very you know genuinely you need to recollect. Number 2 in case of polyhydramnios increased amount of licor. So, increased fundal height in case of twin or multiple pregnancy there can be increase in fundal height. In case of say any hemorrhage concealed antepartum hemorrhage. Yes, there are occurrences in third trimester there may be some hemorrhage and in those cases which are concealed the symphysio fundal height will increase right.

So, number 5 what can happen? Yes, there may be any fibroid in uterus right or any pelvic tumor along with this pregnancy for that tumor or fibroid the size of the fundal height comes more than the period of gestation right. So, these are you know some or you know some other causes like you know the fetus itself is increased in size called as macrosomia. In case of macrosomia also there may be increased fundal height. So, these are the causes another thing to note when you get increased fundal height you need to ascertain whether the bladder is full or not because in case of full bladder you know the bladder if full then the fundus will it will give pressure on the fundus on the uterus and it will go up. So, just before any obstetrical in examination very very very important to note that you need to ask the mother to evacuate her bladder before the examination starts right.

So, this needs to be ruled out. Now, say the symphysio fundal height comes to be 20 centimeter in a 26 weeks gestational age mother. Now, it is less than the period of amenorrhea. Now, what are the causes now again wrong date may be the LMP which she has told or know that is erroneous. Number 2 the fetus itself is smaller in size small for gestational age or any growth retardation of the fetus in uterus in utero growth retardation. Number 3 in case of oligohydramnios the liquor is less and so the fundal height is less and number 4 by chance there is any fetal in utero fetal death then also the growth of the fetus will stop and the fundal height will be less than the period of gestation.

So, these are the inferences we get from the symphysio fundal height. Now, the procedure for measuring correctly the symphysio fundal height I have already told the mother should be asked to evacuate her bladder then she should be in a very relaxed position in a semi recumbent position with pillows under the head and you know the legs should be flexed right. So, to keep the abdomen relaxed just before measuring the legs can be extended when you measure the

fundus. Now, when you palpate the fundus you keep the legs flexed and when you now go for the measurement with the tape then you can straighten the legs right. So, now here you palpate the fundus with the ulnar border of your left hand and you get the fundal height by mark by marking this height.

Now, you take the tape a measuring tape and you start the measuring tape from the from above from the fundal height and you come down to the symphysis pubis right. You come down at the symphysis pubis and now you see by taking out the tape you see the fundal height from the tape right. So, this length of the tape this is the symphysio fundal height and now you have to place this symphysio fundal height on the growth chart right to corroborate the growth of the fetus right. Now, this is plotting of the symphysio fundal height on the growth chart. So, in the growth chart see these are the two important lines.

The tenth percentile this is the tenth percentile line and above this is the 90th percentile line. So, the 90th percentile and the tenth percent this is the upper limit and this is the lower limit and here are the gestational age at say 26 weeks what you get the symphysio fundal height you plot it here. Now, if this plot is in between the tenth and 90th percentile then it is ok. Then she comes at 30 weeks at 30 weeks you get another symphysio fundal height you plot it here and you see that yes the fundal height is increasing and it is within the range.

So, that is normal. If it is down then it will be a case of IUGR. If it goes above then maybe it is a case of macrosomia or other causes which needs to be evaluated. So, if it is less than tenth percentile less than the lower limit then it is a case of IUGR. Whether when the estimated fetal weight is more than the 90th percentile.

So, this is the 90th percentile. This if it goes above the 90th percentile then it is a case of macrosomia right. Now, coming this actually estimated fetal weight we have an idea from the fundal height measurement right. So, this estimated fetal weight is you know how to calculate it. Estimated fetal weight these are you know previously it was done only from clinical point of view you just by clinical examination you palpate the vertex by par vaginal examination you go for the presenting part the vertex and you see whether the vertex is above the ischial spine or below the ischial spine. Now, if the vertex is above the ischial spine then the expected or estimated fetal weight will be from this formula which is symphysio fundal height measured in centimeter minus 12 into 155 right in grams.

And if it is below the ischial spine then this is the formula for estimated fetal weight just minus 11. So, this is called as the Johnson's formula it was used previously by clinical examination to get an you know idea of the fetal weight. Now, we get you know the estimated fetal weight from ultrasound scan by 2 formulas there are Shepard’s formula and the Hadlock's formula. These are all given in the machine and you just have to you know put the parameters. Now, when doing

the ultrasound we get the femur length we get the biparietal diameter the different diameters of the fetus and from those diameters the machine USG machine itself calculate the estimated fetal weight and you get the estimated fetal weight.

So, previously when there was no USG the Johnson's formula was the formula for estimation of fetal weight right. So, these were regarding the symphysio fundal height assessment and estimated fetal weight calculation. Now, coming to the signs absolute signs we have been reading the signs of pregnancy right from the first trimester, second trimester, third trimester to in a nutshell to know about the absolute signs of pregnancy when you can conformally say that yes this is a case of pregnancy that is number 1 when you auscultate the fetal heart sound by the stethoscope right you can hear the fetal heart sound. Number 2 you can palpate the fetal movement by per abdominal examination, you can palpate the fetal parts by putting by the per abdominal examination you can palpate the fetal parts then also it is an absolute sign of pregnancy. Thereby the magic tool we have is the ultrasound machine you know with the ultrasound we can definitely accurately diagnose the pregnancy the location of pregnancy whether intrauterine or extrauterine even the gestational age can be accurately measured if done in the first trimester.

Another point is the fetal skeleton visible on x-ray from 16 weeks though we do not do this x-ray because you know it is not it is contraindicated during pregnancy we do not go for x-ray only to a certain pregnancy, but still you should know that from 16 weeks you can visualize the fetal skeleton right. Now, coming to another important you know phenomenon which is called as pseudocyesis it is nothing but a you know psychological disorder of some infertile woman who have an intense desire to have a baby. You know this is also called as phantom or spurious or false pregnancy. The female has a very hard belief that yes she is pregnant, she has cessation of menses and she feels that she is pregnant, she has all those symptoms morning sickness, you know increased frequency of micturition and sometimes she may even say that yes she can feel the fetal movements inside her abdomen. But when you go for an obstetrical examination it reveals that there is no signs of pregnancy right.

So, immunological test urine sample collected will so negative for pregnancy obstetrical examination will so negative signs and also USG will rule out the presence of any pregnancy, but the female have a very firm belief and sometimes it is very difficult to you know convince her that she is not pregnant right. So, this is a you know psychological issue and needs to be treated by the psychiatrist. Now, coming to we have done the palpation you know of the symphysis fundal height. Now, coming to the palpation of the fetal parts just you know in a gist I will tell that when you palpate a small globular hard part which is ballotable independently it is the fetal head, head of the fetus. Number 2 if you palpate a irregular broad soft structure and it is not ballotable independently.

Now, from the rest of the body it is not ballotable. So, that will be the podalic end or breach, breach of the fetus. Then due to the neck the head can be can move independently from the rest of the body and head is hard smooth globular right. So, this is head and podalic end and when you feel a smooth carved like structure with an uniform resistance all throughout it signifies the spine of the fetus. And lastly when you palpate some nodular irregular knob like structures they are nothing, but the limbs of the fetus. So, these are regarding the palpation of the fetal parts which we start to palpate from 20 weeks.

And lastly is in the auscultation of the fetal heart it can be done by a handheld Doppler and number 2 is the Pinard's Fetoscope. These are the Pinard's Fetoscope. Putting the Pinard's Fetoscope on the abdomen with the bell of the stethoscope you can hear the fetal heart sound from 20 weeks right. But now we have this handheld Doppler and with this Doppler you can hear the fetal heart sound right from 10 weeks. So, these were the third trimester serial wise inspection, palpation and auscultation of the mother right.

So, in a nutshell in the first trimester we have discussed everything you know 6 to 8 weeks there will be signs of early pregnancy and in USG you will get the you know signs of pregnancy that is the gestational sac. We will discuss the USG signs in detail, but to note that USG scan in first trimester is done to confirm, confirm pregnancy. Number 2 is location of the pregnancy whether it is intrauterine or extrauterine meaning ectopic in the tubes we do a early trimester scan. Number 3 is viability of the fetus whether the fetal heart rate or the cardiac activity has come and whether the fetus is all good and you can continue with the pregnancy. If there is any difficulty in the appearance of the gestational sac, in the appearance of the fetal pole, in the appearance of fetal cardiac activity then sometimes you know you cannot allow to continue this pregnancy.

So, for fetal viability a scan at first trimester is very essential. Another thing is your number of fetus whether it is a singleton pregnancy or a multiple pregnancy can be ascertained from first trimester scan right. These are the you know some of the very important criteria of USG. Another very important is the dating scan. Now, from the gestational age calculation, gestational age calculation if someone ask what is the most accurate method of gestational age calculation it is from first trimester USG. Now, around 6 to 8 weeks and the gestational age calculated from the crown rum length of the fetus and this you know age calculation will be you know just plus minus 2 days.

So, this is very accurate. So, we need to learn USG whether there are symptoms, signs, yes they are very important from the clinical point of view, but now we have this magic tool of ultrasonography and we need to note the different you know stages of ultrasound picture of early pregnancy, first trimester scan, second trimester scan, third trimester scan and assess the fetal well being. So, these were all regarding the diagnosis of pregnancy and references taken are

from D.C Dutta book of obstetrics, the Williams obstetrics and the James book on high risk pregnancy. So, thank you all for your patient hearing and you know we are going into the obstetrical examination in our further class we will learn the different obstetrical examination clinically and also we will have a video presentation on a mother antenatal mother right. So, thank you and keep reading.