

Locating Fetal Heart Sounds

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In 1818, M. Mayor (1), an able surgeon practicing in Geneva, was the first, on applying his ear to the abdomen of a patient far advanced in pregnancy, to observe and record the important discovery—the pulsation of the fetal heart.

In 1821, M. J. A. LeJumeau de Kergaradec (1) also independently discovered the sounds of the fetal heart. Although priority is given, and justly so, to Mayor, still full credit is due to Kergaradec, who besides pursuing his investigations further, made an-

other great discovery, that of the uterine souffle. I think it is appropriate to make a few general remarks on the fetal heart sounds and their location.

The fetal heart is situated nearer the cephalic extremity than the pelvic. The posture of the fetus in the uterus is one of anterior flexion, and therefore the sounds of the fetal heart are best transmitted through the back of the fetus. Where the fetus is presenting by the cephalic extremity, the fetal heart sounds must necessarily be heard with

greatest intensity below a line which divides the uterus at about its middle portion. In case the pelvic extremity is presenting, the heart sounds will be heard above this line. In practice, therefore, when the fetal heart is heard below the umbilicus the inference is safe that the presentation is one of the cephalic extremity, and the reverse holds true for the pelvic extremity.

In case of presentation of the vertex the heart sounds will be heard in the left or in the right lower segments, according as the back of the fetus occupies the left or the right segment of the uterus. On the other hand, in breech presentations the heart will be heard in the left or right superior segments, depending upon whether the back of the fetus lies in the left or right of the uterus.

For the vertex we seek the heart sounds along a line connecting the umbilicus and the left or the right anterior superior spine according as the position is left or right anterior. In case of posterior positions of the vertex the maximum intensity is posterior and to the outside of these lines.

In breech presentations the heart sounds are heard where the positions are anterior, to the left or to the right of a line extending through the centre of the umbilicus to the centre of the last rib. The sounds are discernible behind and to the outside of these lines, to the left or to the right, depending on the position, whether left or right posterior.

In case of presentations of the face the heart sounds are heard with maximum intensity in the same localities as in case of presentations of the vertex. Multiple pregnancy may be suspected by the hearing of two or more fetal hearts differing in rhythm and intensity at different points.

DIAGNOSTIC VALUE OF THE FETAL HEART.

It enables us to determine with certainty the existence of pregnancy; it is a valuable aid in the diagnosis of twins, and other conditions, in determining the condition of the fetus (by noting the character and rapidity of the beats at varying intervals); it enables us to arrive at a more correct conclusion regarding the presentation and position of the fetus, and it is invaluable as a guide in determining the advisability and time of interference in operations such as forceps, version, craniotomy, Cæsarean section, and other measures.

CAUSES INTERFERING WITH FETAL AUSCULTATION.

In addition to certain malpositions the following will interfere with auscultation: Thickness of the abdominal parietes (obesity); an excess of liquor amnii; distended bladder; gases in the intestines; accumulation of feces; a fold or folds of the intestine intervening; contractions of the uterus; the action of the abdominal muscles; anterior implantation of the placenta (being a bad conductor of sound), and external noises and the uterine bruit or soufflé. The soufflé, which has been variously likened to whistling, the vibrations of a base cord, the cooing of a turtle dove, aneurysmal or cardiac murmurs, a thick metallic cord in vibration, the blowing of bellows, the rushing of air through the branches of a leafless tree, and other synonyms, has its origin in the large and dilated arteries and veins at the sides of the uterus and is therefore usually heard laterally; more often to the left than to the right

and sometimes anteriorly and rarely all over the uterus. It is my opinion that it is pressure, or lack of pressure on the uterine vessels, that accounts for the occurrence, location, and intensity of the uterine soufflé. The agencies exerting this influence are the abdominal muscles principally and the uterine wall.

The uterus during pregnancy usually assumes a position of combined anteversion and dextroversion, consequently the anterior wall of the uterus is completely supported by the abdominal muscles; the right side partly supported, and the left side least, or none at all. Therefore the soufflé is heard most frequently and loudest on the left side, less on the right, and least of all anteriorly. Another reason for the soufflé being heard less frequently on the right side than on the left is the fact that the anteversion and dextroversion of the uterus causes a degree of torsion of the vessels on that side resulting in a lesser flow of blood through them. When the uterus is situated in the median line, the soufflé may be heard on both sides. If the uterus is retroverted or the abdominal wall is greatly relaxed the soufflé may be heard throughout the whole uterus. During labor the action of the uterine muscle supplements that of the abdominal, as during the height of a contraction the murmur disappears (as there is no blood passing through the uterus). The cause of the complete absence of the uterine soufflé is the tonicity of the uterine vessels, principally, but it may also be a combination of the tonicity of vessels, uterine muscle and abdominal wall.

The uterine soufflé is synchronous with the maternal heart. It may be continuous or intermittent, or distinctly irregular. It is usually single but it may also be systolic and diastolic. The position and periods of audibility of the soufflé are inconstant. These variations may be explained by the inconstancy and incoordination of the action of bloodvessels, uterine muscles and abdominal wall.

Now, since the relation of the uterine soufflé to the abdominal wall involves the principle of cause and effect, that is, the less the pressure of the abdominal wall the louder the bruit, then in order to eliminate it I increased the pressure of the abdominal wall as follows:

Place the stethoscope where you would expect to find the fetal heart, plant the tips of the fingers of your free hand parallel to the transverse diameter of the uterus, from one and a half to two inches above or below the stethoscope (try both) and exert gentle and continuous pressure backward when on the anterior wall of the uterus, and backward and toward the median line when laterally situated.

You will observe the blowing sounds of the uterine soufflé become progressively fainter until they either disappear or they become faint enough for the heart sounds to be audible and countable. Occasionally the character of the soufflé changes from blowing to sonorous or sibilant before becoming faint or disappearing. I have found this method successful in thirty-eight out of forty cases.

I would strongly advocate this method of auscultation in detecting fetal heart sounds in pregnancy or labor when obstructed by the uterine soufflé.

REFERENCES.

1. Cited by James Cummings: *On the Uterine Soufflé and Fetal Heart*. Edinburgh: Oliver & Boyd, pp. i-29, 1875.