A CASE REPORT: USE OF FETAL MRI IN DIAGNOSIS OF FETAL BILATERAL RENAL AGENESIS

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ABSTRACT

OBJECTIVE: The aim of this case report is to show the use of fetal MRI in the diagnosis of fetal anomalies when ultrasound is inconclusive. As most clinicians and radiologists are not familiar with fetal MRI we thought this case report may be useful as an eye-opener to the imaging modality. This is the first case of fetal MRI in Ethiopian setting to the best of our knowledge.

CASE SUMMARY

We report a case of a 27-year-old primigravida mother who came for antenatal care to Myungsang medical center at gestational age of 23weeks. Our initial ultrasound made a diagnosis of a hydramnios, otherwise actively moving fetus. Fetal anatomical scanning by ultrasound failed to make a proper diagnosis. We sent for fetal MRI where the diagnosis of fetal bilateral renal agenesis was made. Random blood sugar of the mother and oral glucose tolerance test were found to be normal. We counseled the family for pregnancy termination and they agreed. Pregnancy was terminated at 24 weeks and autopsy confirmed the diagnosis.

(Ethiopian Journal of Reproductive Health 2016; 8:45-49)

CASE SUMMARY

History:

A 27 years old primigravid mother came to our hospital on June 10/2015 at gestational age of 23 weeks. She felt fetal movement a week before her presentation. She doesn't remember her LNMP. The pregnancy is planned and wanted .She is married and house wife. She has no history of diabetes mellitus or other medical illnesses. She has no history of alcohol or drug abuse. She came for antenatal care. It was her first visit.

There is no leakage of watery fluid per vaginum or discharge. There was no fever, chills or rigors. There was no history of herbal medications. No family history of congenital anomalies.

PHYSICAL EXAM

BP: 100/60mmhg PR: 77/min T: 36 c, Height; 165Cms, Weight: 62kgs

Pink conjunctiva and non-icteric sclera

No significant Lymphadenopathy or thyroid swelling. No lumps in the breasts.

Chest: Clear

CVS: No murmurs or gallop

Abdomen: No hepatosplenomegaly, 22weeks gravid uterus, FHR 158BPM.

No area of tenderness

Kidneys are not palpable, no Costovertebral angle tenderness Speculum examination: No pooling of amniotic fluid on posterior fornix/blade. No leakage from cervical os on valsalva maneuver.

Ferning test was negative

Lab data, ultrasound and MRI result

HIV : Neg, VDRL: NR, HBsAg: Neg. Hemoglobin 13gm/dl, OGTT :FBS 77mg%,1st hour 123mg%,2nd hour 98mg%,3rd hour 83mg%

Fetal ultrasound: anhydramnios (complete absence of amniotic fluid) and gestational age 23weeks. Difficult to do anatomic survey as there was no acoustic window. The detailed anatomic survey couldn't pick any other fetal abnormalities. Bladder was not visualized. Lying down adrenal signs were not detected bilaterally. Bowel occupied the area of renal fossae .The chest circumference was lower than abdominal circumference by 45%, which indicates pulmonary hypoplasia.

Option of amnioinfusion for fetal sonographic survey was offered to the mother and she opted for fetal MRI.

Fetal MRI: Mother was sedated by diazepam 10mg IV slowly before MRI to decrease the fetal movement. Contrast was not used. The result showed absent bilateral kidneys. No other anomalies identified.

Treatment and outcome: The mother was counseled about the prognosis. She was counseled for termination of the pregnancy. She agreed .Labor was induced by misoprostol 200microgram.and she expelled after 2doses .The fetus was alive weighing 650gram.It died few minutes after expulsion. It was sent to autopsy and the autopsy result confirmed the fetal bilateral renal agenesis. Both the father and mother were scanned for renal problem and they were found to be

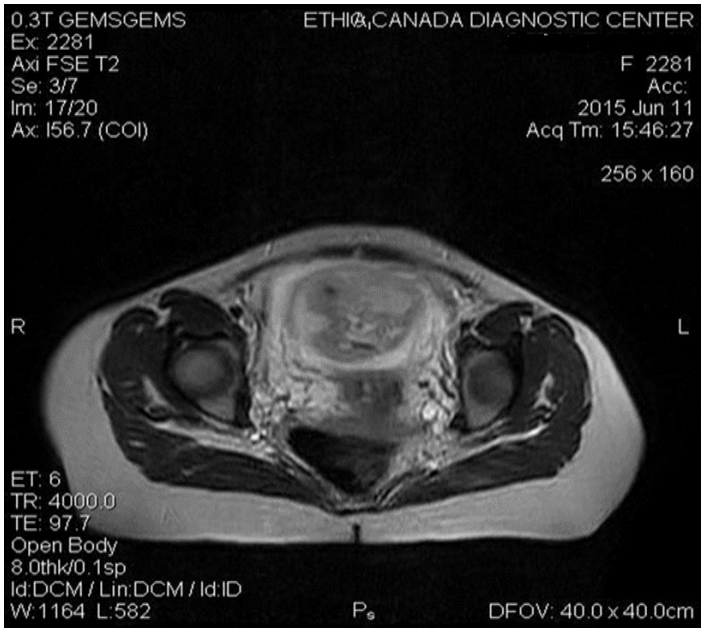

Figure 1.Absent fetal kidneys in transverse view

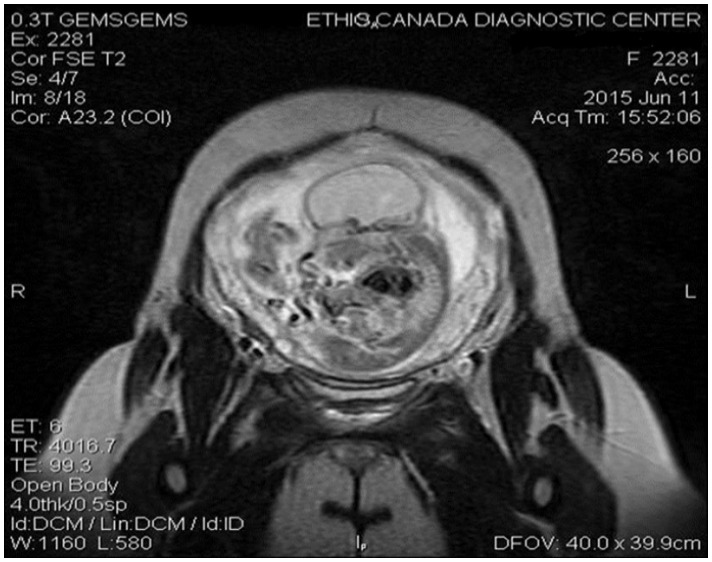

Fig 2: Absent fetal kidneys in mid-sagittal view

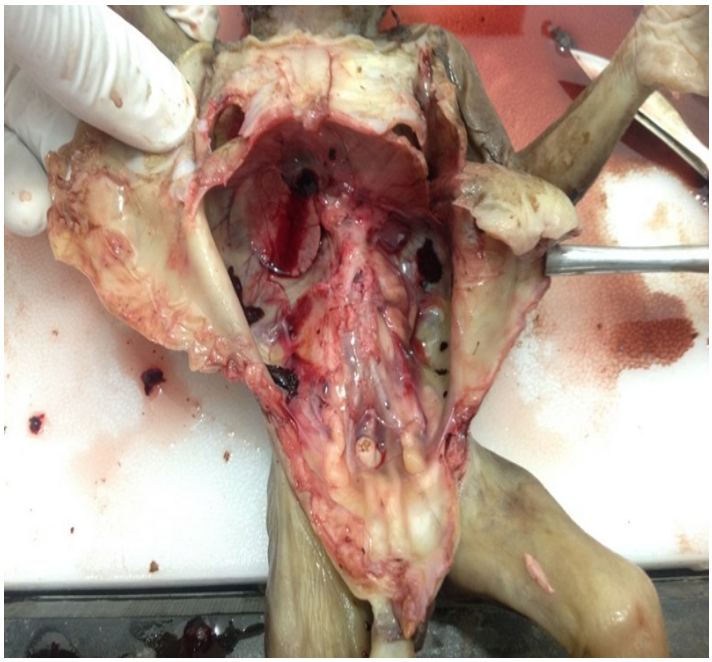

Fig 3: Absent kidneys, ureter and bladder

head circm23cms,CRL20cms, fetal wt 650g,placental wt214g,cordlength20cms syndrome)

normal. She was told to come back for preconception counseling when she plans to become pregnant.

DISCUSSION

Undoubtedly, Ultrasonography (USG) is an ideal imaging procedure during pregnancy. It is noninvasive, inexpensive, with no radiation risk and provides an opportunity to visualize the fetus. Sometimes ultrasound examination might be hampered by maternal obesity, oligo/anhydramnios, fetal position and reverberation caused by bones. When USG is unable to provide a definitive diagnosis, further investigation with more sophisticated methods is necessary. One of these methods is magnetic resonance imaging (MRI), which plays an increasingly important role in fetal

visualization. MRI of a human fetus was first described in 1983 [1]. Initial attempts to use MRI in obstetrics were limited by fetal movement, despite pharmacological immobilization of the fetus [2,3]. Currently, the use of direct fetal paralysis is strongly discouraged.

Some authors recommend pre-procedure maternal sedation in order to decrease fetal movements [4]. Though MRI gives detailed information about the fetus it is more expensive and not portable. It is less available but it is operator independent. The administration of contrast media during pregnancy is still controversial. Gadolinium, which is classified as a category C drug by the Federal Drug Administration (FDA), crosses the placenta, and is excreted by the fetal kidneys into the amniotic fluid. The recommendations of the American College of Radiology Guidance-Document for safe MR practices state that intravenous gadolinium administration should be avoided during pregnancy [5].

Through its superior soft tissue contrast resolution, MRI is able to distinguish individual fetal structures such as lung, liver, kidney, and bowel [6]. Fetal MRI is useful in all fetal organ system, but its superiority is seen in fetal CNS as calvarium cannot obscure the image unlike ultrasound [7].

Renal agenesis may be either unilateral or bilateral. Bilateral renal agenesis is incompatible with extra uterine life because prolonged absence of amniotic fluid results in pulmonary hyperplasia leading to severe respiratory insufficiency at birth. The longest-surviving child lived 39 days [8].

Renal agenesis is due to either never developed from outset or due to regression of cystic kidneys. Bilateral renal agenesis is uncommon prenatal diagnosis with an incidence of 1:10,000. It is a lethal anomaly with 50% of the fetus being stillborn. The rest would die shortly after birth, due to severe pulmonary hypoplasia [9]. It is also associated with many other congenital anomalies including skeletal, genitourinary, tracheoesophageal and brain anomalies, many of which have autosomal dominant or recessive inheritance. Therefore, the risk of such anomalies in the subsequent pregnancy is also increased [10].

It is usually sporadic in nature, but may present with a familial history. It is associated with maternal diabetes [11]. It results from a lack of induction of the metanephric blastema by the ureteral bud. Newborns with bilateral renal agenesis have low-set floppy ears, broad, flat nose, redundant and dehydrated skin, wide set eyes, prominent fold arising at the inner canthus of each eye, parrot beak nose and receding chin. These features are known as Potter's facies [12].

CONCLUSION

Antenatal diagnosis of bilateral renal agenesis is uncommon although important. It is a lethal anomaly with 50% of the fetuses being stillborn and the rest would die shortly after birth, due to severe pulmonary hypoplasia. In a woman who has anhydramnios diagnostic amnioinfusion can be tried to create acoustic window for detailed fetal anatomic survey. If that is impossible because of mother's unwillingness (as in our case) or other reason fetal MRI can be done to make final diagnosis.

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