



MICRO LABS LIMITED

GYNAE SPECTRUM

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Dear Doctor,

Greetings from Micro Labs. We are happy to bring you “Gynae Spectrum”, which contains latest and interesting news in the field of Obstetrics and Gynecology.

This issue contains:

- Metabolites in early pregnancy to predict gestational diabetes mellitus and its implications for fetal programming
- A case of viable Ectopic Pregnancy in the Uterosacral Ligament.
- A novel device for breast imaging

Should you require any article or, medical information, please feel free to contact us medicalservices@microlabs.in

Looking forward to your valuable feedback.

Best Regards,

Medical Team, Micro Labs Limited



1. Metabolites in early pregnancy to predict gestational diabetes mellitus and its implications for fetal programming

Gestational diabetes mellitus (GDM) increases the risk of the mother (preeclampsia, caesarean delivery) and fetus (macrosomia, birth trauma). Inability to accurately identify gestational diabetes mellitus in the first trimester of pregnancy has thwarted ascertaining whether early therapeutic interventions reduce the predisposition to these prevalent medical disorders.

Abnormal fetal programming in gestational diabetes mellitus seems to increase the risk of obesity, type 2 diabetes, and cardiovascular disease.

Aim of the current study is to evaluate whether advanced analytical methods could identify accurate predictors of gestational diabetes mellitus in early pregnancy.

Methods:

A observational nested case-control study involving 100 patients with 50 in gestational diabetes mellitus group and 50 in the control group conducted to determine metabolic profile of urine from normal singleton gravidas vs those who developed GDM determined by Glucose challenge test (GCT) or Glucose tolerance test (GTT).

FBS of >95 mg/dL (for GCT intolerance) and a hemoglobin A1c (HbA1c) of 5.7% in the first trimester of pregnancy (prediabetes threshold for the nonpregnant population) were also used to identify GDM.

Urine samples were collected randomly at 6 to 19 weeks of gestation and stored at 80°C .

Samples were analysed for 951 diverse, lowmolecular weight (<1000) biochemical using ultra performance liquid chromatography tandem mass spectroscopy (UPLC-MS/MS) with positive ion mode electrospray ionization, UPLC-MS/MS with negative ion mode electrospray ionization, and gas chromatography-mass spectrometry.

Metabolomics platform measured 630 endogenous metabolites in randomly collected urine. Multivariate criteria or the most important by 1 method identified low molecular weight metabolites independently associated with gestational diabetes mellitus, and classification selected a subset most predictive of gestational diabetes mellitus.

Results:

Around two-thirds of the 50 gravidas with GDM were diagnosed at 24 weeks gestation with the remainder distributed almost equally between <12 weeks gestation and 12 to 23 weeks gestation.

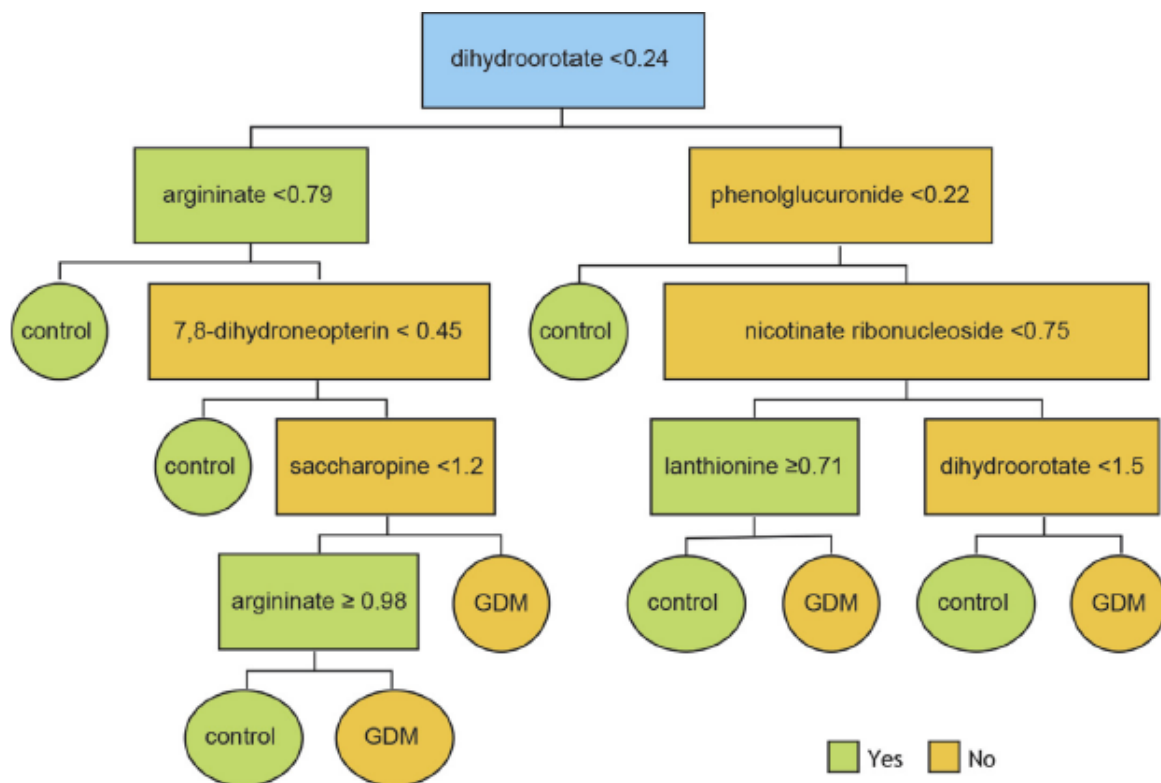
A GCT glucose level of ≥ 200 mg/dL or a GTT (≥ 2 criteria in all but 1 case with 1 criterion) was used to identify 60.9% of cases.



The metabolites distinguishing GDM in early pregnancy included dihydroorotate, phenol glucuronide, 7,8-dihydroneopterin, nicotinate ribonucleoside, lanthionine, and dopamine. Of the 22 selected compound candidates, 12(54.5%) were related to amino acid catabolism, glucose oxidation and fatty acid oxidation. Furthermore other biochemical were involved in antioxidant pathways, likely reflecting hyperglycemia-associated oxidative stress and inflammation.

Findings were consistent with the metabolic disruptions of insulin resistance and diabetes as early as the first trimester of pregnancy.

Classification tree analysis predicted gestational diabetes mellitus with an accuracy of 96.7%, independent of maternal age, body mass index, and time of urine collection shown in figure below..



The prediction accuracy increased according to the number of tree levels as shown in table below.

**Sensitivity, specificity, accuracy, and ROC area for predicting GDM according to the classification tree level**

Level	Metabolites	Sensitivity (%)	Specificity (%)	Accuracy (%)	ROC area
1	di	78.3	65.2	71.7	0.717
2	ar, di, pg	78.3	78.3	78.3	0.832
3	ar, di, ne, nr, pg	89.1	73.9	81.5	0.906
4	ar, di, la, ne, nr, pg, sa	89.1	91.3	90.2	0.946
5	ar, di, la, ne, nr, pg, sa	97.8	95.7	96.7	0.993

ar, arginine; di, dihydroorotate; GDM, gestational diabetes mellitus; la, lanthionine; ne, 7,8-dihydroneopterin; nr, nicotinate ribonucleoside; pg, phenylglucuronide; ROC, receiver operating characteristics; sa, saccharopine.

Koos et al. Urine metabolites predict gestational diabetes. Am J Obstet Gynecol 2020.

Discussion:

Patients diagnosed with GDM at ≥ 24 weeks gestation exhibit in early pregnancy a distinctive array of metabolic perturbations presents a strong argument for diagnosis and intervention in the first trimester of pregnancy.

Probable mechanisms are the perturbed metabolites impair insulin resistance through direct and indirect effects on insulin sensitivity and metabolism. Secondly, the disrupted signaling pathways can alter epigenetic regulatory mechanisms involving transcription factors, chromatin, small ribonucleic acids, and DNA methylation. The resulting epigenetic perturbations potentially dysregulate metabolic, cardiovascular, and neuroendocrine pathways. These mechanisms have been attributed to adverse fetal programming that, in addition to inherited genetic susceptibility, increases risk for significant metabolic and cardiovascular disorders.

Study showed that urinary metabolite phenotype in the first trimester of pregnancy can accurately identify gravidas persons who can develop GDM at ≥ 24 weeks gestation, which will enable randomized, innovative interventions (eg, dietary enhancement of mitochondrial function and biogenesis) targeting short- and long-term perinatal morbidity.

Conclusion:

Assessment of metabolic profile in the first trimester of pregnancy that accurately predicted GDM cases identified in both early and late pregnancies.

Reference:

Koos BJ, Gornbein JA. Early pregnancy metabolites predict gestational diabetes mellitus: implications for fetal programming. Am J Obstet Gynecol. 2021 Feb;224(2):215.e1-215.e7.

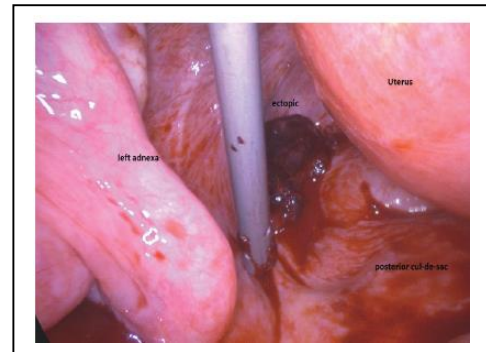


2. A case of viable Ectopic Pregnancy in the Uterosacral Ligament.

An abdominal pregnancy is an ectopic pregnancy implanted outside the uterus, fallopian tubes, and ovaries on either the peritoneum of the pelvis or the abdominal cavity.

It is one of the rare form of ectopic pregnancy. The uterosacral ligament is one of the rarest implantation sites, and only a small number of cases have been reported.

Current is a case of ectopic pregnancy in uterosacral ligament.



Case presentation:

A 32-year-old woman, para 2, in her third pregnancy for 8 weeks, presented with left lower abdominal pain that began a few hours prior and was associated with nausea.

Earlier, patient had two uncomplicated vaginal deliveries, and she experienced a regular 28-day menstrual cycle with no symptoms of endometriosis.

No history of pelvic inflammatory disease and no past pelvic surgeries.

On Abdominal examination, a slight tenderness was felt in the left lower quadrant. A pelvic examination was positive for tenderness above the left adnexa.

Laboratory tests indicated low haemoglobin (11.3 g/dL) and elevated beta-human chorionic gonadotropin (hCG) (17483 mIU/mL). Ultrasonography did not show intrauterine gestation, an endometrial thickness of 16 mm, and normal right and left ovaries. But, to the left of the left ovary there was a gestational sac with a yolk sac and an embryo with a pulse and crown-rump length (CRL) consistent with 8 weeks gestation, according to the Hadlock curve . The gestational sac was located posterolateral to the cervix, adjacent to the left uterosacral ligament, and could be separated from the left ovary by gentle pressure (sliding sign) but could not be separated from the cervix in the same way.

Patient underwent laparoscopic evaluation and management. The laparoscopy revealed a hemoperitoneum of 200 ml which was subsequently drained.

Subsequently uterus appeared normal, and both fallopian tubes and the ovaries were intact - without evidence of rupture or injury.

But , the left adnexa appeared to have adhesions on the inner part of the broad ligament close to the uterosacral ligament.

With closer examination, the left uterosacral ligament had a 2.5 cm mass that appeared to be an ectopic pregnancy. The conceptus was prized from the uterosacral ligament without the



use of electrocautery or incision and sent for histopathological examination.

Repeat HCG test the day after surgery indicated a decrease to 5999 mIU/mL. It continued to decrease and became negative within 3 weeks of the surgery. The patient's 1-month follow-up physical and sonographic examinations were normal.

Discussion:

Pregnancy in Uterosacral ligament is one of the rarest implantation sites, and only a small number of cases have been described.

Ectopic pregnancy within the uterosacral ligament depend upon the patient's condition, beta hCG, gestational age and size, presence of a foetal pulse, and the surgeon's skill. It can be managed surgically, using laparoscopy or laparotomy, or pharmacologically, through administration of methotrexate.

Surgical removal alone may be sufficient for definitive treatment.

Conclusion:

A successful removal of ectopic pregnancy from left uterosacral ligament was done.

Reference:

Aiob A et al. Viable Primary Ectopic Pregnancy in the Uterosacral Ligament: A Case Report and Review of the Literature. Gynecol Obstet Case Rep. 2021; 7(1):3

IN FOCUS

3. A novel device for breast imaging

A company is releasing an impressive 12 megapixel monitor intended for use in breast imaging. At 31 inches in size, the 12MP can be used instead of two separate 5 megapixel monitors that are now ubiquitous in radiologic imaging.

Two different mammography or tomography exams can be easily compared using one screen without the distracting plastic bezel in between.

The FDA has approved display comes with a high-speed graphics controller for Tomo image processing, as well as Double Black Imaging's own comprehensive calibration software, which includes CFS Client and fleet Web Manager Calibration for automatic calibrations.

Being a multi-modality display, the 12 MP can be quickly switched between 6 megapixel and 12 megapixel modes, to best match the output of the imaging technique being looked at.

According to company features: Product features according to the product page:



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- Automatic calibration with local and Web-based remote administration
- Email alerts for proactive workstation maintenance
- Total control of display settings, including remote adjustment and calibration testing
- Comprehensive reporting for Joint Commission, MQSA, Fleet tracking, asset management, and DICOM compliance
- Exclusive Radiologist Productivity toolkit



Reference:

Available at: <https://www.medgadget.com/2021/02/huge-12-megapixel-display-for-breast-imaging-fda-cleared.html>. Accessed on 19-02-2021.



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