AML IN Pregnancy

Urea mmol/L

01Y  1 6   0 20  

 998Y  2.8 8.1

Creatinij umol/L

07D  0 100   0 100  

 04W  10 70   0 100  

 04Y  15 40   0 100  

 99Y  60 105   0 400

ALT U/L

01Y  0 45    

 99Y  0 41   0 100

AST U/L

04W  0 75    

 01Y  0 65    

 99Y  0 32

LDH U/L

30D  365 1450    

 05W  365 1450    

 06M  310 790    

 01Y  325 670    

 99Y  240 480    

 998Y  240 480

BILI

Normal Range: 0.1-1.2 Direct (conjugated to glucuronide) bilirubin, 0.1-0.4 mg/dL (< 7 µmol/L); Indirect (unconjugated) bilirubin, 0.2-0.7 mg/dL (< 12 µmol/L) mg/dL

**Case Number: 2**

**Case Summary:**

20week G1P0 with hepatospleenomegaly.

**History**

A 22yo G1P0 female presented to ER with amenorrhea, pyrexia, anaemia, and a rash over her limbs.

Examination revealed pallor, peteciae, hepto-spleenomegaly, and a enlarged uterus corresponding to appox 20weeks of gestation (confirmed via ultra sound).

Patient had a miscarriage at 12 weeks one year previously.

No significant family or personal history noted.

**Microscopy:**

**Core Data**

WCC 2.4 - L

HB 46 - L

MCV 85 - N

MCH 27 - N

MCHC 350 - N

PLT 6 - L

Other:

Urea 16 - H

Creatinine 42 umol/L – N

AST 140 U/dl - H

ALP 676 U/dl - H

LDH 1083 mg/dl – H

TBIL Bil 1.31mg/dl - H

Question 2:

Further tests:

Option 1 ASXL1 and TET2 mutations

Option 2 B12 and Folate

Option 3 BM Biopsy + Flow

Option 4 JAK2 & BCR/ABL fusion 1 gene

Answer 2: 3

Dialog 1

Negative.

These RNA splicing mutations are generally used in investigation of myelodysplastic syndromes

Dialog 2

Folate 8.56 – Low, B12 Normal

Dialog 3 .

BM examination revealed 75% non-erythoid blasts with high/nuclear cytoplasmic ratio, which demonstrated positivity with Sudan Black and Myeloperoxidase and were negative for periodic acid-Schiff.\n

\nBlasts were of Type 1 (agruanlar) and Type II (granular).

\nApproximately 10% of remaining non-erythoid cells were maturing granulocytes.

\n

Flow cytometry analysis with a Beckman Coulter Cytomics F500 showed the blasts population was positive for CD13, CD33, CD34 and CD11/CD14/36/64/68 negative.

\n\n

Cytogenetic’s revealed a normal XX type.

Dialog 4

Negative.

JAK2 and BCR/ABL fusion genes are used investigating of Myeloproliferative disorders ie CML, ET, PRV.

**Question 3: What is diagnosis**

Option1 : Pure Erythroid Leukemia

Option 2: AML –M5 Monblastic

Option 3: AML – M2

Option 4: Acute Basophilic Luekemia

Answer 3: 3

**Summary**

AML M6 and M5 (erythoid and Monocytic) are PAS (periodic acid-Schiff) negative. \n\n

Monocytic AML will demonstrate CD11/CD14/36/64/68 positivity.\n\n

Pure erythoid luekmia (AML M6 FAB) will demonstrate a HLD-DR+/-, CD34-, CD71+ flow profile.\n\n

Acute Basophilic Luekaemia (WHO classification) – very rare and occurs as an end stage leukaemia in less than 1% of all cases of CML.

\n\n

This patient had AML M2 ( FAB classification), the WHO equivalent Acute myeloblastic leukaemia with maturation.\n\n

The Patient received induction chemotherapy (3 + 7 regimen) with Daunorubicin 60 mg/m2 /day x 3 days and cytosine arabinoside 200mg/m2 /D x 7 days as continuous infusion.

\n Post induction 2 weeks a marrow was performed which was found to be very hypocellular. A repeat in 2 weeks show complete remission and a normal cellular marrow.

She delivered a healthy female newborn with no signs of disease or congenital defects.

Post delivery she then received 3 courses of consolidation chemotherapy using high dose cyosine arabinoside.

\n\n

Leukemia in pregnancy occurs in approx 1 i 10000 pregnancies.\n

The decision to introduce or postpone chemotherapy must be balanced against the impact on maternal and fetal survival and morbidity.\n

AL diagnosed in first trimester invariably necessitates chemotherapy and is likely to result in foetal malformations. Conversely, AL diagnosed in the second trimester does not necessarily require termination and treatment is similar to those of nongravid patients.

The outcome of gravid women diagnosed with AL appears to be worse than that of their age-matched non gravid counterparts. However, the survival rate of fetuses exposed to chemotherapy is encouraging and the incidence of malformations and low birth weights for gestation is low.

(Israel Henig, 2013)

?Question 4:

What is pathogenesis of this condition?

Option A Somatic Mutation – Of a single cell within a minor population of stem or early progenitor cells in the bone marrow or thymus.

Option B

Option C

# Bibliography

Haematology, A. S. (2015). *ASH Image Bank*. Retrieved March 2015, from American Society Of Haematology: http://imagebank.hematology.org/

Israel Henig, M. (2013). Acute Myeloid Leukemia Diagnosed During Pregnancy: Facing Challenges. Systematic Review and Analysis Of 174 Reported Cases. *Blood* , 121.

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HELLP

**Case Number: 3**

**Case Summary:**

Fragmentation in blood film

**History**

A 27yo G1P0 34+5 /40 presented to ER unwell with a history of PET, visible odema and proteinuria.

Patient was experiencing abdominal pain (RUQ, epigastric), nausea, vomiting, and a sever headache and sight impairment.

**Microscopy:**

Case3a

Case3b

Case3c

**Core Data**

WCC 19 - H

HB 75 - L

MCV 85 - N

MCH 27 - N

MCHC 350 - N

PLT 50 - L

Other:

AST 220 U/dl - H

ALP 260 U/dl - H

LDH 1230 mg/dl – H

TBIL Bil 22 mg/dl - H

Question 2:

What is the pathogenesis of this condition:

Option 1 Immune related

Option 2 ADAMTS13 Def

Option 3 Anti ADAMTS13 Ab

Option 4 Familial

Answer 2: 1

Dialog 1

Immune related.

HELLP develops form sever PET.

It is postulated that Debris shed from syncytial surface of placenta in normal pregnancy generates a immune stimulus and endothelial stimulation.

Endothel activation causes release of vWF which interacts spontanpoisely with platelets and with subsequent platelet activation.

The immune stimation results in Imbalance pro/anti-angiogenic factors (eg Elevated sFlt-1; sEng) and endothelial dysfunction, which subsequently causes hyertension and proteinuira.

The syndrome become sHELLP with platelet actovation and microvascular plartelt trhrombi formati0n, haemolsyis and liver dyspgfucntion.

Dialog 2

A lack of activity in the ADAMTS13 enzyme (a type of protein in the blood) causes thrombotic thrombocytopenic purpura (TTP). The ADAMTS13 gene controls the enzyme, which is involved in blood clotting.

Not having enough enzyme activity causes overactive blood clotting. In TTP, blood clots form in small blood vessels throughout the body. These clots can limit or block the flow of oxygen-rich blood to the body's organs, such as the brain, kidneys, and heart.

Dialog 3 .

In acquired TTP, the ADAMTS13 gene isn't faulty. Instead, the body makes antibodies (proteins) that block the activity of the ADAMTS13 enzyme

Dialog 4

Familial

The cause of nonalcoholic fatty liver disease is not clear. Certain factors tend to increase risk, but in some cases, no risk factors show up. However, NAFLD tends to run in families. It also shows up most often in people who are middle-aged and overweight or obese. These people often have [high cholesterol](http://www.webmd.com/cholesterol-management/default.htm) or [triglycerides](http://www.webmd.com/cholesterol-management/lowering-triglyceride-levels) and [diabetes](http://www.webmd.com/diabetes/default.htm) or [prediabetes](http://www.webmd.com/diabetes/guide/prediabetes) ([insulin resistance](http://www.webmd.com/diabetes/guide/insulin-resistance-syndrome)), as well.

Other potential causes of fatty liver disease include\n:

* [Medications](http://www.webmd.com/drugs/index-drugs.aspx)\n
* Viral [hepatitis](http://www.webmd.com/hepatitis/default.htm)\n
* Autoimmune or inherited liver disease\n
* [Rapid weight loss](http://www.webmd.com/women/rapid-weight-loss)\n
* Malnutrition\n

Recent studies show that an overgrowth of bacteria in the small intestine and other changes in the intestine may be associated with nonalcoholic fatty liver disease. Some researchers now suspect this may play a role in the progression of NAFLD to NASH.

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**Question 3: What is diagnosis**

Option1 : TTP

Option 2: Viral Hepatitis

Option 3: HELLP

Option 4: Acute Fatty Liver in Pregnancy

Answer 3: 3

**Summary**

The correct answer is HELLP.\n

Fragmentation or schistocytosis, where RBCs have characteristic sharp projections and sometimes resemble helmet cells, are commonly seen in Microangiopathic Haemolytic anaemia (small vessel disease). Blood film may also show spherocytosis, micro-spherocytosis and thrombocytopenia depending in the cause. Common causes are:\n\n

* TTP\n
* DIC\n
* HUS\n
* Mechanical Heart valve haemolysis\n
* HELLP\n
* Prematurity of the newborn\n
* Necrotizing enterocilitis (NEC)\n
* Malignancy
* Cyclosporin therapy
* HIV infection\n\n

Acute fatty liver disease of pregnancy (may present with hepto-renal failure) and viral hepatitis are not usually associated with a MAHA/Schistocytosis. \n

TTP is characterised by a pentad of clinical features, namely fever, thrombocytopenia, anaemia, neurological symptoms and renal disease. Absence of the latter two make this the likely diagnosis.

HELLP (Haemolysis, elevated liver enzymes an low platelet count) is a multi-system syndrome occurring in severe preeclampsia (PET) and eclampsia. It affetcts both primiparous and multiparous women in third trimester of pregnancy. DIC and renal failure are seen in sever cases. \n\n

Haemolysis is non-immune intravascular caused by small vessel damage with endothelial dysfunstion and fibrin deposition. Frre haemoglobin and haemogloibinuroia is seen in combination with low haptoglobins (haptoglobin-Hb complex).

\n\n

Targeting of liver by inflammatory stimulus induced by endothelial dysfunction and coagulation activation causes is reflected in elevated AST/ALT.\n

Thrombocyopenia is caused by platelet activation, adhesion to damages vascular endothelial cells with subsequent increased platelet turn over.

\n\maternal complications include Abruptio placentae, DIC, post partum haemorrhage (PPH), visual loss.\nFoetal comlitcaions include higher pernital mortality, IUGR (Intrauterine growth retardation), prematurity, and neonatal thrombocytopenia. \n\n

Management is by immedatite delivery if possible. Corticosteroids should be considered if <34 weeks gestation. Management of PET complications (convulsions, hyperteniosn), and possibly platelet transfusion.

\n\Summary

* Schistocyosis is commonly seen in MAHA
* MAHA in a mertanl sett9ng is commonly assocated with be seen in DIC, TTP, HELLP
* MAHA is a non immune intravascular haemolysis
* HELLP is a life threating condition with high foetal and maternal morboity/mortality if treatment is delayed.

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