RANZCOG SYMPOSIUM 2022 New Perspectives

# Case report of a primigravida with Gitelman Syndrome: a chronic salt wasting renal disease

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## Introduction

Gitelman syndrome (GS) is an autosomal recessive renal disorder caused by gene mutation in SLC12A3. It affects the distal convoluted renal tubule (DCT) causing inappropriate potassium, magnesium and calcium losses. Fatigue, muscle weakness and muscle paralysis are common symptoms. Incidence is 25 per million, therefore, pregnancy incidence is not well defined or reported.[1] Despite risks related to hypokalaemia and hypomagnesemia, GS in pregnancy has a good prognosis when treated properly but requires more intensive control of the disease. This case reports GS affecting pregnancy and its management in a small regional hospital.

## Methods

Patient medical records from pre-conception to post partum were reviewed with consent. A PubMed literature search with key words "Gitelman Syndrome pregnancy" and "Gitelman Syndrome pregnancy eplerenone" yielded 20 reports from 2012- present, which were used to support case findings.

## Case report

A 24-year-old primigravida previously diagnosed with GS was referred for Obstetric and Obstetric Medicine care at 11+4 weeks gestation. Pre-conception she was on oral Span K and Magmin. Those doses were increased by her renal physician when pregnancy was confirmed. At 22 weeks pregnant she was commenced on eplerenone, which was increased after she had asymptomatic hypokalaemia to 2.8mmol/L (see Figure 1). She was diagnosed with gestational diabetes (GDM) at 28 weeks, controlled with diet modification. She was monitored with weekly blood testing and subsequent titration of electrolyte supplementation. Serial foetal ultrasounds were conducted, all showed normal growth and amniotic fluid volume. She had medical induction of labour for gestational diabetes and maternal request at 39+5 weeks pregnant. She spontaneously ruptured her membranes after prostins and did not require oxytocin. She had a prolonged second stage of labour requiring vacuum assistance and the birth was complicated by 2.7L post-partum haemorrhage (PPH), attributed to a complex 2nd degree tear.

The baby was born with APGARS 8, 9, weighing 3.9kg. She required oral iron supplementation after a 30-point Haemoglobin drop post PPH and discharged two days postpartum. Her electrolytes remained in normal range from delivery till review 6 weeks post partum. She ceased eplerenone at delivery and declined spironolactone on discharge, choosing Span K and Magmin instead.

## Discussion

Pregnancy increases renal blood flow, glomerular filtration rate and aldosterone, causing urinary potassium and magnesium losses. Healthy pregnant women can tolerate this increased urinary loss.

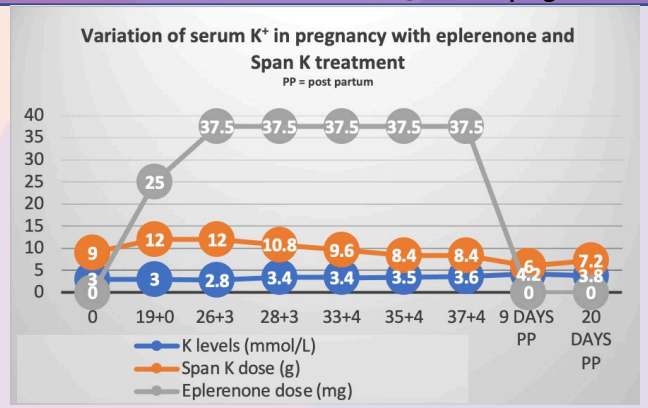


**Figure 1: graph of patient's K+ levels and treatment**

In GS, disruption of sodium chloride reabsorption in the DCT activates the renin-angiotensin-aldosterone system which increases aldosterone and results in hypokalaemia, hypomagnesemia and metabolic alkalosis (see Figure 2 and 3). Therefore, while GS was diagnosed pre-conception in this case, maternal GS is often unmasked in pregnancy because of uncontrolled urinary potassium and magnesium losses.[1]

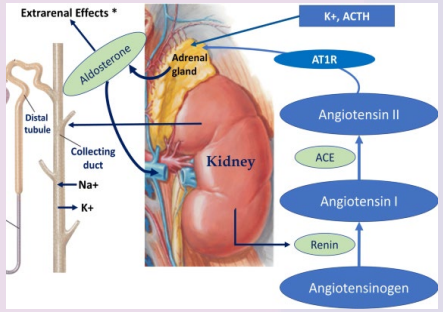


**Figure 2: activation of RAAS in GS[12]**

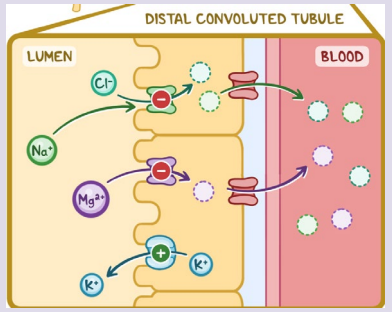


**Figure 3: pathology of the DCT seen in GS[13]**

There is conflicting evidence regarding strictness of electrolyte control in maternal GS. Literature suggests serum potassium ≥3 mmol/L and magnesium ≥0.6 mmol/L adequate for successful pregnancy.[2] However, it has also been suggested normalization of potassium and magnesium is not required for good obstetric and neonatal outcome.[3] Even so, same as non-pregnant patients, hypokalaemia increases potential for ventricular tachyarrhythmia. Therefore, safe management in this case was deemed as weekly blood testing and regular ECGs. Some case studies also suggest having continuous ECG monitoring in labour.[4,5] Little is known about how maternal hypomagnesemia affects foetal growth and development. There is no proven link between hypomagnesemia and gestational diabetes but evidence suggesting causality is accumulating.[6]

Our patient developed GDM but reducing the oral glucose load with diet alone was sufficient to reduce postprandial hyperglycaemia. No maternal-fetal complications like macrosomia occurred. This supports Yuan et al. hypothesis GS patients have impaired glucose metabolism and insulin secretion but no impairment of insulin sensitivity.[7] This is the fourth documented case describing GS, pregnancy and gestational diabetes.[8] However, there is insufficient data to suggest correlation.

Oral potassium and magnesium are mainstay therapy for GS.[9] This alone may be insufficient and potassium-sparing diuretics like eplerenone or spironolactone may be added. In this case, eplerenone (an anti-aldosteronic devoid of anti-androgenic effects unlike spironolactone) was started at 19 weeks gestation when potassium was 3.0mmol/L.[8] Serial foetal ultrasounds were performed to detect possible oligohydramnios, a known side effect of diuretics.[10]

GS does not necessitate caesarean delivery. As this case reports, patients can have a vaginal birth with good electrolyte control.[11] Our case was complicated by a massive PPH and bolus oxytocin was used to delineate where the bleed originated. In the case oxytocics are required in labouring GS patients, careful attention must be paid to electrolytes, as high or prolonged oxytocin dosing can cause water intoxication and further electrolyte disturbance.

## Conclusion

Pregnancy with GS presents challenges in management as electrolyte control may be difficult. This case illustrates the importance of frequent laboratory monitoring and electrolyte supplementation for maternal GS. It also demonstrates close liaison within a multidisciplinary team is of paramount importance for good obstetric and neonatal outcomes.

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