Multidisciplinary management of Gitelman Syndrome in pregnancy: A case report from a regional hospital ϕ

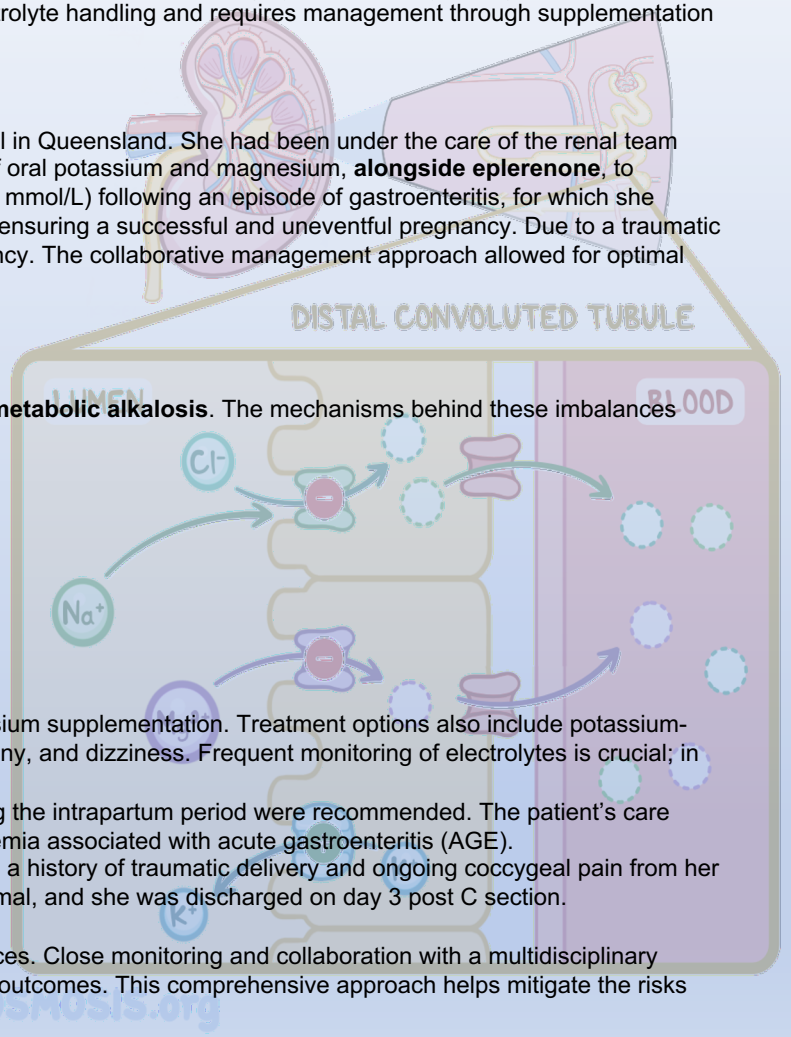
ϕ Pankhuri Punj, Preeti Patil
Rockhampton Base Hospital, Rockhampton, Queensland

INTRODUCTION

Gitelman Syndrome (GS) is a rare autosomal recessive disorder caused by mutations in the **SLC12A3** gene on chromosome 16q13. It leads to electrolyte imbalances, including hypokalemia, hypomagnesemia, metabolic alkalosis, and hypocalciuria. GS has an incidence of 1 in 40,000 people, with even rarer occurrences during pregnancy. This disorder affects renal electrolyte handling and requires management through supplementation and careful monitoring.

CASE

A 27-year-old female, G2P1, with a history of Gitelman Syndrome (GS) diagnosed at 16 years of age, presented for antenatal care at a regional hospital in Queensland. She had been under the care of the renal team since diagnosis and was on Span K and Magmin prior to conception to manage her condition. During her pregnancy, she required an increased dose of oral potassium and magnesium, **alongside eplerenone**, to manage her electrolyte imbalances. Her antenatal period was largely uneventful, aside from an emergency department visit for severe hypokalemia (<1 mmol/L) following an episode of gastroenteritis, for which she needed intravenous potassium replacement. A multidisciplinary team involving obstetrics, nephrology, and obstetric medicine was involved in her care, ensuring a successful and uneventful pregnancy. Due to a traumatic birth with her previous pregnancy, which left her with ongoing back and coccyx pain, she opted for an elective Caesarean section in her current pregnancy. The collaborative management approach allowed for optimal care of both her renal condition and pregnancy.



DISCUSSION AND MANAGEMENT

Gitelman syndrome is caused by mutations in the **SLC12A3** gene, leading to electrolyte imbalances, including **hypokalemia**, **hypomagnesemia**, and **metabolic alkalosis**. The mechanisms behind these imbalances include:

- **Loss of Sodium Chloride Cotransporter (NCC) Function**:
  - Decreased sodium chloride reabsorption in the distal convoluted tubule (DCT).
  - Increased sodium delivery to the downstream connecting tubule and cortical collecting duct (aldosterone-sensitive distal nephron).
- **Potassium Secretion Mechanism**:
  - Enhanced sodium reabsorption via the epithelial sodium channel (ENaC) increases the driving force for potassium secretion.
  - Volume depletion, aldosterone, and angiotensin II activate ENaC, further promoting potassium secretion.
- **Hypomagnesemia**:
  - Downregulation of TRPM6 (magnesium transporter) in the DCT due to impaired NCC function.
  - Decreased TRPM6 expression leads to renal magnesium wasting and hypomagnesemia.

During pregnancy, increased renin and aldosterone levels can exacerbate electrolyte imbalances, necessitating higher doses of potassium and magnesium supplementation. Treatment options also include potassium-sparing diuretics like spironolactone and eplerenone (pregnancy category C). Common symptoms of Gitelman syndrome include fatigue, cramping, tetany, and dizziness. Frequent monitoring of electrolytes is crucial; in this case, it was done every 2-3 weeks with a target potassium level of 2.9-3.0 mmol/L.

Gitelman syndrome can also increase the risk of ventricular arrhythmias, prolonged QT interval, and sudden death, so baseline and repeat ECGs during the intrapartum period were recommended. The patient's care involved routine reviews by both obstetric medicine and the renal team, which contributed to a smooth pregnancy besides an episode severe hypokalaemia associated with acute gastroenteritis (AGE).

The patient required an increased potassium and magnesium supplementation (as compared to preconception levels) throughout her pregnancy. Given a history of traumatic delivery and ongoing coccygeal pain from her previous pregnancy, she opted for an elective Caesarean section. Electrolyte monitoring was conducted at 12-24hours post-operatively, which was normal, and she was discharged on day 3 post C section.

In conclusion, pregnancy with Gitelman syndrome presents a significant challenge in management due to the difficulty in controlling electrolyte imbalances. Close monitoring and collaboration with a multidisciplinary team, including obstetricians, anaesthetists, nephrologists, and obstetric medicine specialists, are essential for ensuring optimal maternal and neonatal outcomes. This comprehensive approach helps mitigate the risks associated with electrolyte disturbances and supports the overall health and well-being of both the mother and fetus throughout the pregnancy.

REFERENCES
1. Raffi F, Fairlie FM, Madhuvrata P, Bennet WM. Pregnancy with Gitelman's syndrome. Obstet Med. 2011 Mar;4(1):39-41. doi: 10.1258/om.2010.100046. Epub 2011 Mar 1. PMID: 27579097; PMCID: PMC4989652.
2. Ibrahim, A., Rodan, A.R., Westenfelder, C. *et al.* Gitelman syndrome patient managed with amiloride during pregnancy and lactation. *BMC Nephrol* **25**, 403 (2024). https://doi.org/10.1186/s12882-024-03801-w
3. Moustakakis MN, Bockorny M. Gitelman syndrome and pregnancy. Clin Kidney J. 2012 Dec;5(6):552-5. doi: 10.1093/ckj/sfs126. PMID: 26064481; PMCID: PMC4400552.