

Basic Science E-Poster

EP_S001

THE EFFECT OF TUBE TYPE AND TIME ON GLUCOSE STABILITY

Prisheila Mahendran¹, Jeyakantha Ratnasingam², Farhi Ain binti Jamaluddin¹, Ai Chin Yeoh¹, Nurdini binti Alias¹, Khalida binti Ramdhan¹, Pavai Sthaneshwar¹

¹Division of Laboratory Medicine, Department of Pathology

²Endocrine Unit, Department of Medicine, University Malaya

INTRODUCTION

Glycolysis continues after blood collection and may reduce glucose concentrations in vitro, potentially compromising diagnostic accuracy. The effectiveness of glycolysis-inhibiting additives differs among blood collection tubes. Citrate rapidly inhibits glycolysis through immediate acidification, whereas fluoride acts more slowly by inhibiting enolase at a later stage of the glycolytic pathway. This study aimed to compare short-term glucose stability in four commonly used blood collection tubes under routine laboratory conditions.

METHODOLOGY

Venous blood samples were collected from 100 volunteers into Rapid Serum Tubes (RST), Barricor tubes, Fluoride tubes, and Citrate tubes. Glucose concentrations were measured at 30 and 60 minutes after collection using the hexokinase method. A repeated-measures ANOVA was performed to evaluate the effects of Time, Tube Type, and the Time × Tube interaction ($\alpha = 0.05$), followed by Bonferroni-adjusted pairwise comparisons.

RESULTS

At 30 minutes, glucose concentrations were highest in the Fluoride tube (5.528 mmol/L), followed closely by the Citrate tube (5.505 mmol/L), while lower values were observed in RST (5.434 mmol/L) and Barricor tubes (5.430 mmol/L). By 60 minutes, glucose levels had declined in all tubes; however, the decrease was more pronounced in serum-based tubes. RST values fell to 5.277 mmol/L and Barricor to 5.300 mmol/L, whereas Fluoride and Citrate tubes remained relatively stable at 5.449 mmol/L and 5.489 mmol/L, respectively. Overall, glucose decreased significantly between 30 and 60 minutes (mean decrease = 0.096 mmol/L, $p < 0.001$; partial $\eta^2 = 0.705$). Tube Type also had a significant effect on glucose concentrations ($F(3,297) = 42.06$, $p < 0.001$; partial $\eta^2 = 0.298$).

CONCLUSION

Fluoride and Citrate tubes provided the most effective preservation of glucose concentrations over 60 minutes, showing minimal glycolytic decline. In contrast, RST and Barricor tubes demonstrated significantly greater glucose loss, highlighting the importance of rapid processing when serum-based tubes are used.

EP_S003

THERAPEUTIC PLASMA EXCHANGE FOR PREOPERATIVE STABILIZATION IN GRAVES' DISEASE COMPLICATED BY AGRANULOCYTOSIS

Muhammad Azim Puad¹, Nadia Nordin¹, Elliyyin Katiman¹, Hazwani Aziz¹, Hidayatil Alimi Keya Nordin¹

¹Hospital Tengku Permaisuri Norashikin

INTRODUCTION

Severe thyrotoxicosis is particularly difficult to manage when antithyroid drugs are contraindicated. Therapeutic plasma exchange (TPE) is an adjunctive option in complicated hyperthyroidism, including thyroid storm and refractory thyrotoxicosis, through the rapid removal of circulating thyroid hormones, hormone-binding proteins, cytokines, and thyroid autoantibodies. However, its precise role and indications remain incompletely defined. We report two patients with Graves' disease complicated by carbimazole-induced agranulocytosis in whom TPE was used as bridging therapy before total thyroidectomy.

CASES

The first patient was a 32-year-old female who developed carbimazole-induced agranulocytosis 1 month after the diagnosis of hyperthyroidism. Biochemical control remained unsatisfactory despite second-line therapy with high-dose lithium, cholestyramine, propranolol, corticosteroids, and 5 days of Lugol's iodine. Over 8 days, free thyroxine (fT4) increased by 13%, necessitating TPE for preoperative stabilization. Following three cycles over 4 days, fT4 decreased by 20%, from 52 to 41 pmol/L, enabling successful total thyroidectomy.

The second patient was a 26-year-old female who presented with neutropenic sepsis and severe agranulocytosis 2 months after being diagnosed with Graves' disease. She received second-line therapy, and neutrophil recovery occurred only after 7 days of granulocyte colony-stimulating factor. TPE, together with Lugol's iodine, was then initiated as bridging therapy before surgery. After 5 days of Lugol's iodine and three TPE cycles, fT4 decreased by 43%, from 58 to 33 pmol/L, permitting total thyroidectomy.

CONCLUSION

These cases highlight TPE as a useful bridging strategy in Graves' thyrotoxicosis when antithyroid drugs are precluded by agranulocytosis, and conventional second-line therapy fails to achieve adequate biochemical control. TPE may facilitate timely stabilization and safe progression to definitive surgical treatment.