The QASC Implementation Project: Fever and Sugar Protocols

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FEVER
FeSS Fever Protocol

ASU admission temperature

< 37.5°C
- Monitor temp Q4-6H

≥ 37.5°C
- Remove blankets/heaters
- Administer paracetamol PO/PR/NGT/IV^ (as per hospital policy)

> 38°C
- Monitor temp Q4H
- Inform medical team & consider septic screen as per hospital/stroke unit protocol
- Monitor temp Q4H

[^]: PO = Per Oral
PB = Per Rectal
NGT = nasogastric tube
IV = Intravenous
Q4H = every four hours
**Fever QASC Clinical Protocol:**

- 4-6 hourly temperature readings for 72 hours
- Temperature $\geq 37.5$ C treat with paracetamol
Fever Post Stroke

• Associated with a significant increase in morbidity and mortality\(^1\) attributed to:
  • Increased cerebral metabolic demands
  • Changes in the blood-brain barrier permeability
  • Acidosis
  • Increased release of excitatory amino acids

\(^1\) Den Hertog HM, et al. 2011
SUGAR
Formal venous glucose & HBA1c required on admission to hospital. If this was not done in the Emergency Department it should be done on admission to the Stroke Unit. If finger prick BGL on admission to stroke unit >10, formal glucose should be repeated.

**QASC Sugar Protocol**

- Initial finger prick Blood Glucose Level (BGL) on admission to stroke unit
- NB: all BGL readings given in mmol/L

- **T=0 hr**
  - **BGL ≤10**
    - **Non-diabetic**
      - Fasting & after meals fingerprick BGL testing. If not eating test BGL 6 hourly
    - **Known Diabetes**
      - Before & after meals & bedtime fingerprick BGL testing. Continue routine diabetes medication if eating. Cease usual diabetes medications if not eating and test BGL 4-6 hourly

- **BGL >10**
  - Insulin/glucose infusion for first 48 hours, with hourly BGLs (reduce to q2h if stable for 4 hours). Suspend oral diabetic medications. Titrate insulin to maintain BGL 5–10 or as per local iteration algorithm

All type 1 diabetes patients unable to swallow should follow the red box.
Fasting & after meals fingerprick BGL testing. If not eating test BGL 6 hourly

No further treatment

Any BGL >10 in first 48 hrs go back to red boxes

Before & after meals & bedtime fingerprick BGL testing. Continue routine diabetes medication if eating. Cease usual diabetes medications if not eating and test BGL 4-6 hourly

Any BGL >10 in first 48 hrs go back to red boxes

Insulin/glucose infusion for first 48 hours, with hourly BGLs (reduce to q2h if stable for 4 hours). Suspend oral diabetic medications. Titrate insulin to maintain BGL 5-10 or as per local titration algorithm

After 48 hours cease infusion if patient stable and tolerating oral intake. Resume usual diabetic medications including insulin. Continue before & after meals & bedtime fingerprick BGL testing

T=48 hrs
Sugar QASC Clinical Protocol:

- Formal venous glucose on admission
- 1-6 hourly finger-prick glucose for 72 hours
- Glucose > 10 mmol/L: treat with insulin
Sugar Post Stroke

• Associated with a significant increase in morbidity and mortality\(^2\) attributed to:
  • Toxic to the brain
  • Insulin deficiency
  • Undiagnosed vascular disease
  • Blood brain barrier disruption

\(^2\) Clement et al. 2004
Fever and Sugar Management

• ‘Salvaging’ the ischaemic penumbra
• Critically hypoperfused but still viable brain tissue
• Penumbral brain tissue exists out to 48 hours post stroke onset and is generally considered to be the ‘target’ of most acute stroke therapies

- There is a strong association between initial glucose levels and outcomes of stroke, in particular mortality

- A meta-analysis showed that amongst NON DM patients, those with initial hyperglycaemia (BGL ≥6.1-8.0 mmol/L) had a 3.07 fold (95%CI 2.50-3.79) higher risk of death than those without hyperglycaemia

2 Clement et al. 2004, 3 Capes et al. 2001
Australian Diabetes Society

Guidelines for Routine Glucose Control in Hospital

2012

https://www.diabetessociety.com.au
Conclusions

• Clear association between hyperglycaemia and mortality in acute stroke

• There is a lack of clinical trial evidence regarding appropriate glucose targets in stroke, and the recommendation is made on the basis of extrapolation from other clinical situations, and consensus
Recommendations and Practice Points

- Patients admitted to hospital with acute stroke who have hyperglycaemia, should be treated to achieve and maintain glucose levels less than 10 mmol/L
- Hypoglycaemia must be avoided, and therefore it would be prudent to avoid treatment which lowers the glucose below 5 mmol/L
S/C vs IV Insulin

- Hot topic
- Science is inconclusive
- WE recommend iv over s/c insulin
Why IV?

• Monitoring should occur every 1-2 hours
  • insulin can be adjusted frequently
• IV insulin has immediate results
• IV access to give glucose if necessary
• S/C rapid acting insulin blunt effect
Conclusion

- In terms of effectiveness and safety IV insulin is the preferred mode of delivery in acute stroke if BSL >10

- We recommend clinicians to follow their locally agreed protocols, our recommendation are guidance ONLY – LHD have the right to choose their own local protocols
Let’s talk about...

• We support champions to raise discussion with senior local Medical Clinicians/Endocrinologist if their guidelines differ from the QASC/ADS recommendations with help and support from the QASC implementation team
References


• Australian Diabetes Society Guidelines for Routine Glucose Control in Hospital
Any Questions?