SIMulatED

Royal Darwin Hospital Emergency Department

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# Scenario Run Sheet: Tet Spells

## Scenario Overview

**Estimated SIM Run Time: 25Mins**

**Estimated Guided Reflection Time: 25Mins**

**Target Group: ED Reg’s/Nurses +/- Paed Reg/RMO**

**Brief Summary:** 3M Male, presents with distress and 2 episodes of “turning blue” for the first time today. Now resolved. Child has an echo confirmed diagnosis of TOF and is awaiting Adelaide cardiac surgeon/cardiology review.(2 days away). Has had poor feeding and weight gain since birth.

Child looks well, in mum’s arms while she gives the history (in paeds cubicle), but starts to have a tet spell as soon as becomes distressed. OE child becomes cyanosed, tachycardic, sats 60%, clear chest, ESM at upper sternum L and R, single second heart sound. There is a moderate metabolic/resp acidosis on VBG. Child is requires a focussed assessment and concomitant initiation of O2 /analgesia/knee to chest position/10ml/kg bolus/consider ketamine. Further measures can include BB/Vasopressors/Bicarb/I&V.

## Learning Objectives

**General**

**Scenario Specific**

* Paediatric history taking including birth history/neonatal issues/feeding/vaccines/familial conditions etc
* Physical assessment of the sick child with potential CHD
	+ Colour/Liver edge/murmurs/pulses/chest signs/CR/sepsis signs
* Tests
	+ Rule out sepsis and metabolic causes also
	+ Importance of bedside tests eg cap or VBG, glucose, ECG,
	+ The classic appearance of a TOF CXR
	+ ECG – RAD/RAE/RVH
* Identification of Tet Spell
	+ Sudden onset of cyanosis in a distressed child with cardiac Hx
	+ Murmur
* Management of Tet Spell (with primary aims of increasing SVR, reducing hypoxia and acidosis)
	+ Console and calm child, knees to chest, full monitoring
	+ Morphine (or midaz/ketamine), O2
	+ 10ml/kg fluid bolus
	+ Correct cause ?hypoxia/pain/arrhythmia/hypoglycaemia
	+ If fails – beta-blockers (esmolol or propranolol 0/1mg/kg)
	+ Pressors - Phenylephrine/metaraminol (both 0.01mg/kg) or noradrenaline IVI
	+ Intubate and ventilate

## Equipment Checklist

**Equipment**

Paed Canulation

Monitoring and defib

**Medications and Fluids**

PGE1, ketamine , morphine, NaCl, phenylephrine, metaraminol, noradreanaline

**Documents and Forms**

Paed Obs chart

**Diagnostics Available**

CXR with boot shaped heart and oligaemic lung fields

**VBG** with mixed metabolic and resp acidosis

**Heart sounds** player for ESM of pulm stenosis with single second heart sound

**Echo report and clinic letter if asked for**

## Scenario Preparation/Baseline Parameters

**Initial Parameters**

P 120

BP 70/5

RR 32

Afebrile

Sats 91%

**During Tet Spell**

P180

BP 60/40

RR 60

Afebrile

Sats 60%

## Participants

**Staff**

1 nurse and 1 doctor to start with

**Instructor Roles**

To provide VBG/CXR/Clinic letter and echo report

To relay exam findings/start crying noise on ipad/play murmur sound

**Mother – Paed trainee**

## Additional Information/Medical History

**Demographics:** 3M, single mother from Darwin, first child, unemployed, poor education, limited understanding of the condition.

**HPC:** Recent poor weight gain and feeding difficulties (“it takes nearly an hour to take a bottle”). Seen by a paediatrician in Darwin as had a “murmur and borderline oxygen levels” and subsequent echo that shows a “heart problem” that will need surgery before the baby is 6 months old. Mum states that there are 4 things wrong with the heart (“Tet-something”) but she can’t remember the proper name of the condition. Due to go to Adelaide in 2 days to see the paediatric surgeon.

**PMH:** Home birth (precipitous), no immediate neonatal issues, had 2 month vaccinations, due 3M now. BW 3.1kg. Current weight 4.1kg. Takes ages to feed. Bottle fed from birth. No FH. No meds. NKDA

## Proposed Scenario Progression

- Triage sheet provided stating that cyanotic distressed episodes now resolved, baby is well and obs are within normal limits

- Child looks well in mum’s arms sitting in a chair in paeds area, observations have been taken and are within normal limits for age

- History taking from mum with salient points identified

- When child is examined becomes distressed and cyanotic (baby crying sound effect played)

- Obs rechecked and baby is tachcardic, with sats of 60%, RR 50, afebrile – consistent with a tet spell

- OE -cyanosed, tachycardic, sats 60%, clear chest, ESM at upper sternum L and R, single second heart sound.

- Move to resus bay

- VBG - moderate metabolic/resp acidosis

- CXR – boot shaped heart

- Mum becomes distressed

- Non pharmacological measures – knees to chest and mum to console ?sucrose

- Pharmacological measures – O2, morphine/ketamine/midazolam, IVF 10ml/kg NaCl

- Contact with ED consultant/paeds/paeds cardiology

- Further measures beta blockers, vasopressors, ?bicarb

- Intubate and ventilate (if scenario progressing rapidly this will be allowed but doubt we will get that far)

## Debriefing/Guided Reflection Overview

**General Opening Questions**

* How was the scenario? (each team member reflects)
* What happened in the scenario – i.e. relay the story to a workmate who wasn’t there

**Scenario Specific Questions**

* What was wrong with the patient?
* What medications/investigations may be required?
* Where does the patient need to go?

**General Wrap-Up Questions**

* What did you find most beneficial about this scenario
* What was the most challenging point in this scenario?
* What would you do differently next time?

## Case Considerations/Notes

What are the normal sats?

Absence of fever and presence of a murmur should raise suspicions of a cardiac lesion

Upper and lower limb BPs for coarctation

Pre and post ductal sats

Right sided obstruction = Blue

Left Sided obstruction = Grey and shocked

Large right to left shunt = pink but with eventual RV overload and CCF

3C’s –1. Clamp down (knee to chest – prone if poss), 2. Chill out with morph or ketamine, 3. Correct acidosis – supportive,m O2, gentle fluids 5-10mls/kg)

* + **1. Knee to chest**
	+ **2. Administer 100% 02**
	+ **3. Morphine**
	+ **4. Saline bolus**
	+ **5. NaHCO3**
	+ **6. Phenylephrine**
	+ **7. Ketamine**
	+ **8. Esmolol gtt**

**9. Intubate and sedate**

Danford et al published a study of the application of

information theory to determine clinically relevant

variables in the decision to start a PGE1 infusion.

Their analysis revealed that outcome is improved by

early PGE1 treatment in any cyanotic newborn with a

murmur or poor pulses regardless of how ill they

appear and in any critically ill newborn who has

either cyanosis or poor pulses.

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