

# Simulation: Tox (Sotalol and TdP)

## Title:

## Learning Objectives: (enter - identify/demonstrate etc) - technical/non-technical

1. Application of Toxicological approach (RRSIDEAD) to a resuscitation scenario
2. Making an adequate Risk Assessment in a Toxicological resuscitation in the setting of Sotalol overdose
3. Management of the patient with Torsades Des Pointes and specifically in preventing ongoing TdP in the poisoned patient
  - a. Correcting electrolyte disturbances
  - b. Giving Magnesium
  - c. Increasing HR to reduce Torsades Risk
4. Display effective Non-Technical Skills in management of Toxicological Resuscitation

## Take Home Points:

1. The importance of risk assessment in managing a Toxicological resuscitation
2. The importance of managing risk factors and predisposing factors in Toxicological resuscitation

## Sim Brief - Introduction, Familiarisation, Ground Rules, Basic Assumption

## Case Stem (for participants) – Read out to participant at the start.

Brief case history. Typically ambulance handover style (MIST - Mechanism/Medical Complaint, Injuries/Illness, Signs & Symptoms, Treatment so far)

Mrs Betty Bloca, 80y.o lady being brought in by ambulance following an intentional overdose of her husbands Sotalol. Took 6x 80mg tablets of her husbands.

## Background Info (For instructors eyes only)

- 80yo lady.
- PMHx: depression. Recently found out her husband was diagnosed with lung ca.
- Medications: Citalopram 20mg OD
- Ideal progression of Sim

## SCGH ED Simulation Template

- Pt. wheeled in conscious but Brady, slightly hypotensive but can give some history.
- Ideally history taken, establish amount of tablets taken and make a risk assessment. Include PMHx and recognise Citalopram is predisposing factor to TdP with coingestion of Sotalol
- Investigate appropriately – ECG showing brady. + prolonged QT, VBG showing hypokalaemia and hypocalcaemia (recognise this increases risk)
- Pt. is progressively bradycardic during this assessment
- Eventually goes into Polymorphic VT arrest (TdP)
- Team must go through appropriate ALS and treat with Magnesium SO<sub>4</sub>
- Pt. eventually gets ROSC, but will continually go back into TdP until all predisposing factors are managed
  - Bradycardia addressed
  - Hypokalaemia addressed
  - Hypocalcaemia addressed
  - Continue to give Magnesium
  - Citalopram voiced as a risk factor
- Continue in this way until risk factors managed or until no further progress
- There should be appropriate call for help (Tox. On-call + Senior ED physician help +/- ICU)
- Appropriate disposition planning

## Settings for SIM Man/Woman

Significant moulage not required

Settings as per already on ALSi iPad – bradycardia, hypotension,

## Equipment required

- Cardiac monitor/Defib
- ECG printouts – Prolonged QT, TdP, Bradycardia
- VBG/ABG printouts – hypokalaemia, hypocalcaemia – 2 VBGs
- Imaging printouts – CXR – normal. CXR with adequate intubation if required
- O<sub>2</sub> +/- masks/NP
- IVC equipment
- Relevant specific medications – magnesium, roc/inhalers/nebulisers
- Relevant products - colloids/crystalloids/blood

## Participants required

- ED Registrars – Team Lead, Airway, Circ/Defib

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- Nursing Staff – at least airway + drugs, ideally defib. and scribe

### Scenario Outline

Brief outline in table form of step-by-step progression of SIM  
Include possible alternatives and end-points

<b>Scenario Outline</b> (Outline of what should occur at each stage)	<b>Participant Response</b> (Expected or ideal response)	<b>Outcome</b> (what do participants do, what happens to SIM mannequin)
Stem given to team	Role allocation. Plan of approach.	
Patient arrives with Ambulance	Patient transferred over. Handover given to team. Begin to obtain a history	Mannequin makes some groaning noises. Obs should begin to be taken.
Assessment of patient	ABCDE approach  ED Reg. reviews charts <ul style="list-style-type: none"> <li>- Notices vital signs</li> <li>- Low BP</li> <li>- Bradycardia</li> <li>- RR 16</li> <li>- GCS 14/15</li> </ul>	A: "feel terrible" B: Clear C: Bradycardic and hypotensive <ul style="list-style-type: none"> <li>- IV access ensured</li> <li>- Bloods sent, ABG/VBG</li> </ul> D: GCS 14-15/15 E: nil relevant
Initial Treatment Patient Deterioration	Notice: <ul style="list-style-type: none"> <li>- Sotalol and Citalopram both prolong QT</li> <li>- ECG displays longQT</li> <li>- HypoCa and HypoK on VBG</li> </ul>	<ul style="list-style-type: none"> <li>- Ideally begin relevant corrections for abnormal values immediately and display recognition of TdP risk.</li> </ul>

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	Begin to take steps to remedy this	<ul style="list-style-type: none"> <li>- Regardless, pt begins to progressively brady.</li> <li>- Eventually, patient will go into TdP</li> </ul>
Resus	<ul style="list-style-type: none"> <li>- Pt. goes into TdP</li> <li>- Team gives MgSO4</li> <li>- Deliver shocks to patient adequately</li> <li>- Begin to institute management of risk factors if not already done so (Correct K, Correct Ca)</li> <li>- Overdrive pace</li> </ul>	<ul style="list-style-type: none"> <li>- Patient reverts back to sinus brady. With long QT</li> <li>- Patient then goes back into Torsades</li> </ul>
Ongoing Resus	<ul style="list-style-type: none"> <li>- Patient continues to go in and out of TdP until all RFs are managed or no progress occurs</li> <li>- Call for help (Tox – who gives advice)</li> </ul>	<ul style="list-style-type: none"> <li>- End Sim</li> </ul>

**Debriefing Objectives:**

- Cover Toxicology of Sotalol OD
- Discuss Long QT if required
- What is TdP?
- Discuss what the management of TdP is.
- Relevant Non-Technical Skills.

# Blood Gas 1

Sample (ABG/VBG)	Value	Reference Range
pH	7.45	7.35 - 7.45
pCO <sub>2</sub>	30	35 - 45 mmHg
pO <sub>2</sub>	50	75 - 100 mmHg (arterial)
HCO <sub>3</sub> <sup>-</sup>	24	22 - 26 mmol/L
Base Excess	0	-2 to +2 mmol/L
Hb	120	135 - 180 g/L
Na <sup>+</sup>	140	135 - 145 mEq/L
K <sup>+</sup>	3.1	3.5 - 5.0 mEq/L
iCa <sup>2+</sup>	0.90	0.90 - 1.15 mmol/L
Cl <sup>-</sup>	100	96 - 106 mmol/L
Anion Gap	24	22 - 26
Lactate	1.5	0.5 - 1.0 mmol/L
Bilirubin		
Creatinine	120	50 - 120 mmol/L

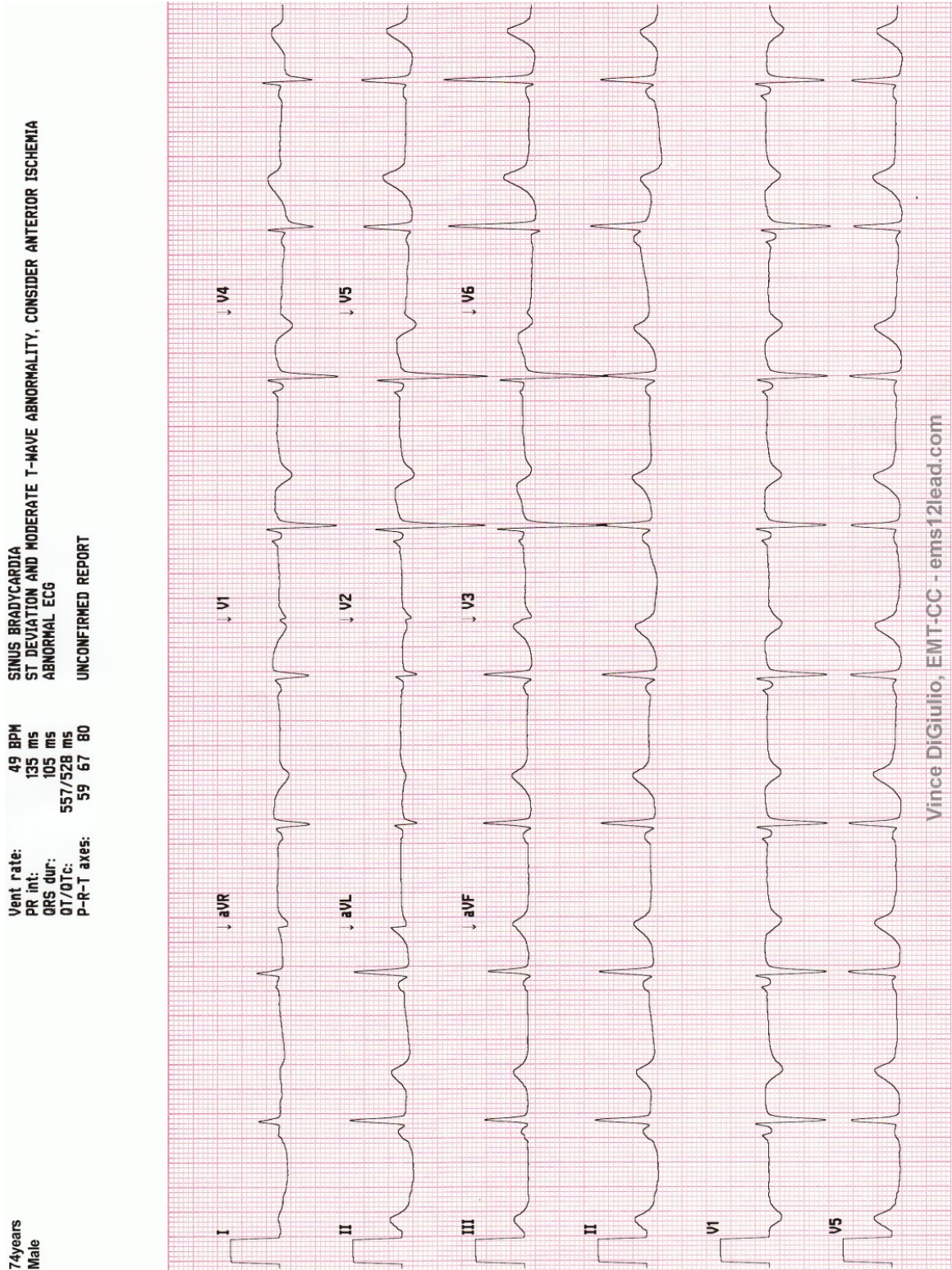
## Blood Gas 2

Sample (ABG/VBG)	Value	Reference Range
pH	7.45	7.35 - 7.45
pCO <sub>2</sub>	30	35 - 45 mmHg
pO <sub>2</sub>	50	75 - 100 mmHg (arterial)
HCO <sub>3</sub> <sup>-</sup>	24	22 - 26 mmol/L
Base Excess	0	-2 to +2 mmol/L
Hb	120	135 - 180 g/L
Na <sup>+</sup>	140	135 - 145 mEq/L
K <sup>+</sup>	2.9	3.5 - 5.0 mEq/L
iCa <sup>2+</sup>	0.90	0.90 - 1.15 mmol/L
Cl <sup>-</sup>	100	96 - 106 mmol/L
Anion Gap	24	22 - 26
Lactate	1.8	0.5 - 1.0 mmol/L
Bilirubin		
Creatinine	120	50 - 120 mmol/L

## Blood Gas 3

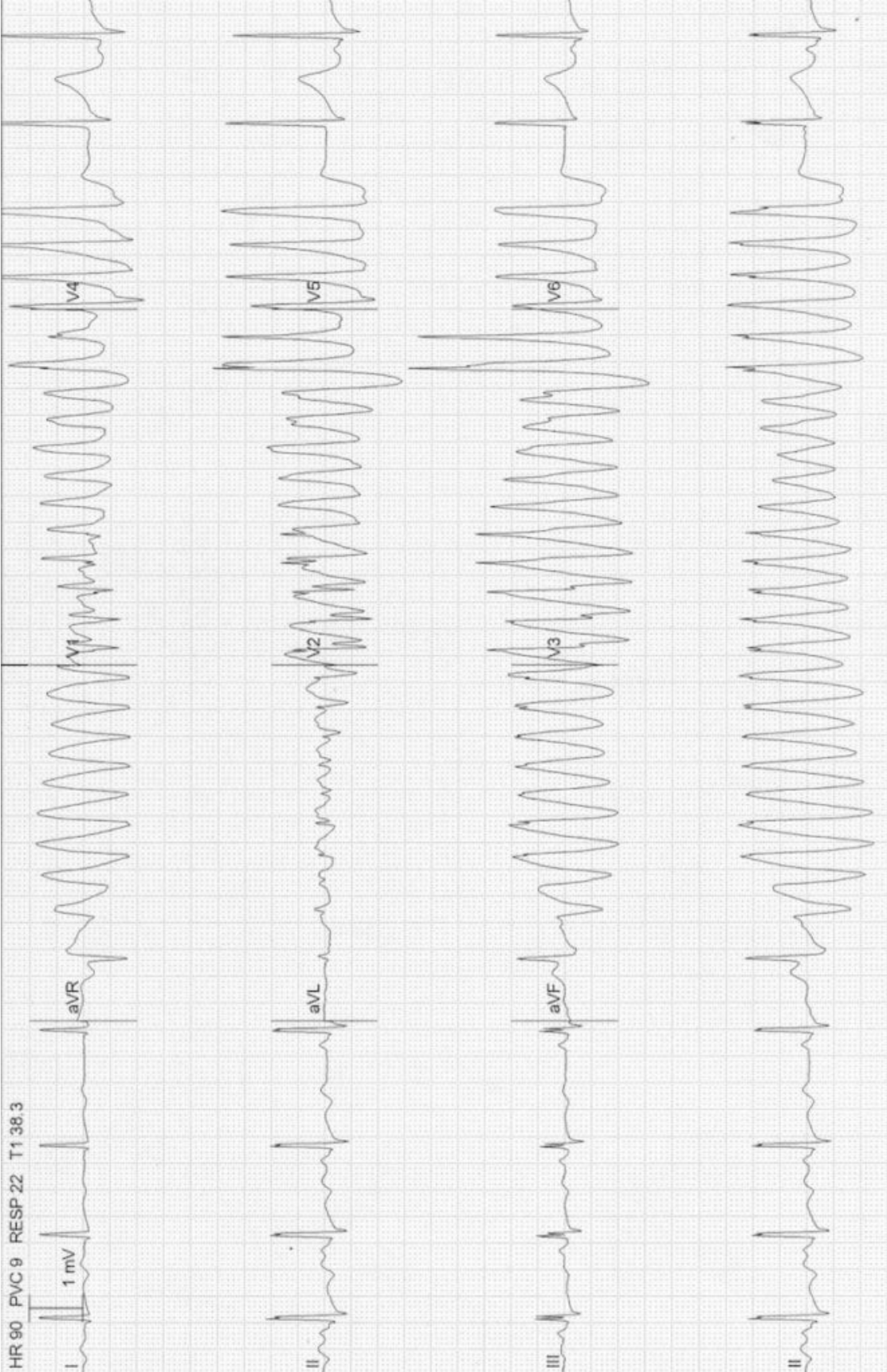
Sample (ABG/VBG)	Value	Reference Range
pH	7.40	7.35 - 7.45
pCO <sub>2</sub>	40	35 - 45 mmHg
pO <sub>2</sub>	50	75 - 100 mmHg (arterial)
HCO <sub>3</sub> <sup>-</sup>	24	22 - 26 mmol/L
Base Excess	0	-2 to +2 mmol/L
Hb	120	135 - 180 g/L
Na <sup>+</sup>	143	135 - 145 mEq/L
K <sup>+</sup>	4.0	3.5 - 5.0 mEq/L
iCa <sup>2+</sup>	1.10	0.90 - 1.15 mmol/L
Cl <sup>-</sup>	100	96 - 106 mmol/L
Anion Gap	24	22 - 26
Lactate	1.5	0.5 - 1.0 mmol/L
Bilirubin		
Creatinine	120	50 - 120 mmol/L

Include Imaging/ECG here:





SCGH ED Simulation Template



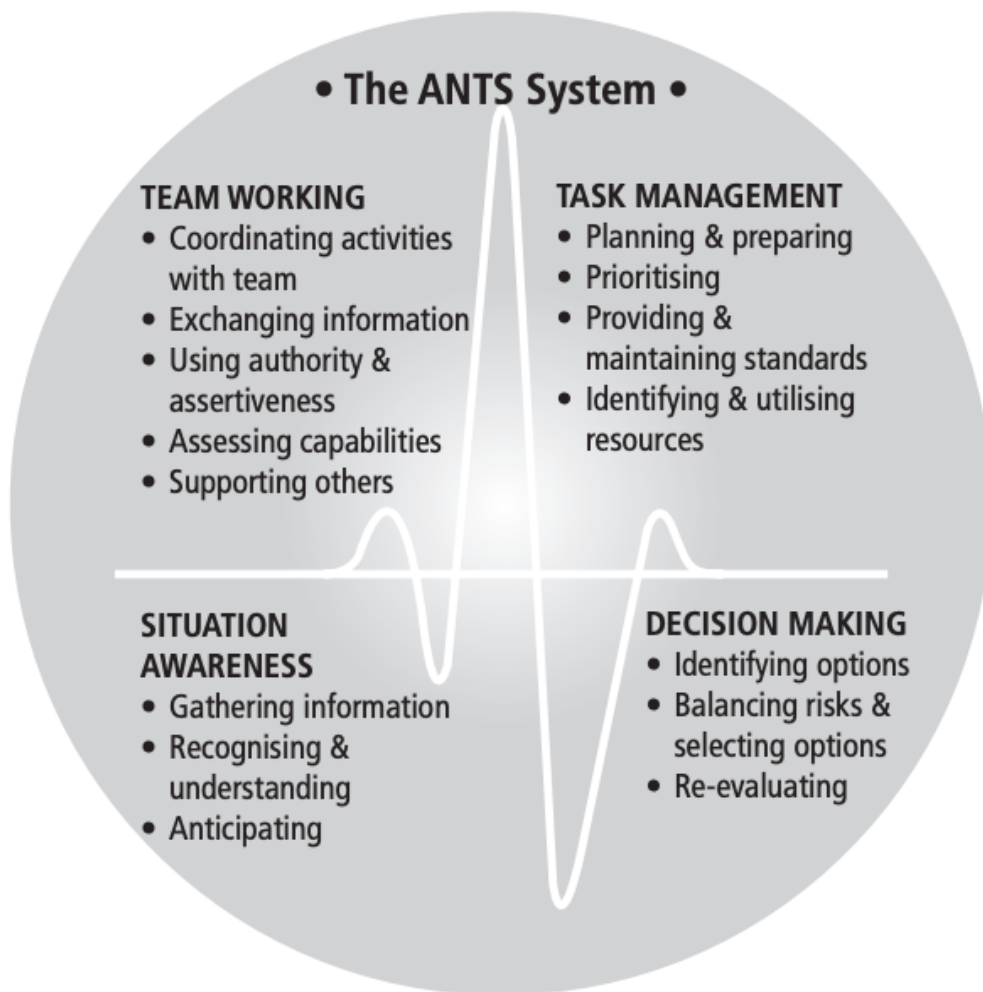
## Non-Technical Skills

It is suggested to implement a consistent, frequent and repeated teaching of non-technical skills during SIM in order to entrain these skills.

The anaesthesia is a suggested framework that can be applied for the observation of SIM.

See below for a brief screenshot of the framework, and a link to the ANTS handbook for further information.

Feel free to choose your own approach here.



ANTS Framework

<https://www.abdn.ac.uk/iprc/documents/ANTS%20Handbook%202012.pdf>