

Case 27

You are the Foundation Year 2 doctor working in General Medical Centre. Your GP supervisor is Dr Dolittle. Your bleep number is 2468.

Patient details

Patient name: Sarah Jane
Date of birth: 18/08/1951
Patient number: X70785862

History

3 months ago Sarah Jane was discharged from St Elsewhere Hospital after a 6 week stay. She has been diagnosed with bipolar disease and was commenced on lithium by her psychiatrist 3 months ago.

She has attended the GP today to have bloods done for routine monitoring for her medication. Sarah reports no symptoms or side effects.

It is currently 9.30am and she recalls taking her last dose last night at 9.30pm. She is currently taking lithium carbonate 250mg. She has no recent bloods on the system for comparison.

Examination

Oxygen saturations: 99% (room air) Respiratory rate: 16bpm

Heart rate: 86bpm

Blood pressure: 118/74mmHg

Temperature: 36.9 C

Task

Please request the 3 most important blood tests to monitor the new medication.

Patient number: <i>X70785862</i>		Clinical details: (<i>Incl. current antibiotic therapy</i>) Routine monitoring of lithium medication for management of bipolar disorder. Currently on lithium carbonate 250mg. Last dose 12 hours ago.
Surname: <i>Jane</i>	Forename: <i>Sarah</i>	
D.O.B.: <i>18/08/1951</i>	Sex (please circle): M <u>F</u>	
Ward: <i>General Medical Centre</i>	Consultant <i>Dr Dolittle</i>	
Specimen date: <i>04/05/2023</i> <i>(Today's date)</i>	Time: <i>09:30am</i>	
Requesting MO: <i>Niamh Garratt (F2)</i>	Bleep: <i>2468</i>	Signature: <i>N Garratt</i>
BIOCHEMISTRY	HAEMATOLOGY	MICROBIOLOGY / VIROLOGY
<input checked="" type="checkbox"/> U/E <input type="checkbox"/> Bone profile <input type="checkbox"/> Liver profile <input type="checkbox"/> Gamma GT <input type="checkbox"/> Amylase <input type="checkbox"/> Ionised calcium <input type="checkbox"/> Magnesium <input type="checkbox"/> Urate <input type="checkbox"/> CRP <input type="checkbox"/> Ferritin <input type="checkbox"/> Immunoglobulins <i>Other (specify):</i> <i>Lithium level</i>	<input type="checkbox"/> Glucose <input type="checkbox"/> <i>tick if fasting</i> <input type="checkbox"/> HBA1c <input type="checkbox"/> Urine microalbumin <input type="checkbox"/> Cholesterol <input type="checkbox"/> Lipid profile <input type="checkbox"/> <i>tick if fasting</i> <input checked="" type="checkbox"/> Thyroid profile <input type="checkbox"/> <i>on T4</i> <input type="checkbox"/> Cyclosporin <input type="checkbox"/> Tacrolimus <input type="checkbox"/> FBC <input type="checkbox"/> ESR <input type="checkbox"/> B12/Folate <input type="checkbox"/> Glandular fever screen <input type="checkbox"/> Haemoglobinopathy screen <i>Other (specify):</i>	<input type="checkbox"/> INR <input type="checkbox"/> APTR <input type="checkbox"/> Coagulation screen <input type="checkbox"/> Thrombophilia screen Specimen type: <input type="checkbox"/> Culture and sensitivity <input type="checkbox"/> AFB/TB culture <input type="checkbox"/> HIV <input type="checkbox"/> HBsAg <input type="checkbox"/> HCV Ab <i>Other (specify):</i>
		IMMUNOLOGY
		<input type="checkbox"/> Auto AB screen <input type="checkbox"/> Rh Factor <input type="checkbox"/> ENA Abs <input type="checkbox"/> ANCA <input type="checkbox"/> DNA Abs <input type="checkbox"/> Thyroid Microsomal Abs <input type="checkbox"/> Total IgE <i>Other (specify):</i>

Answer

Drug monitoring blood tests is a classic examination question, but luckily the answers you need can nearly always be found in the BNF.

Serum concentrations

Lithium salts have a narrow therapeutic/toxic ratio and should therefore not be prescribed unless facilities for monitoring serum-lithium concentrations are available.

Samples should be taken 12 hours after the dose to achieve a serum-lithium concentration of 0.4–1 mmol/litre (lower end of the range for maintenance therapy and elderly patients).

A target serum-lithium concentration of 0.8–1 mmol/litre is recommended for acute episodes of mania, and for patients who have previously relapsed or have sub-syndromal symptoms. It is important to determine the optimum range for each individual patient.

Monitoring of patient parameters

Manufacturer advises to assess renal, cardiac, and thyroid function before treatment initiation. An ECG is recommended in patients with cardiovascular disease or risk factors for it. Body-weight or BMI, serum electrolytes, and a full blood count should also be measured before treatment initiation.

Monitor body-weight or BMI, serum electrolytes, eGFR, and thyroid function every 6 months during treatment, and more often if there is evidence of impaired renal or thyroid function, or raised calcium levels. Manufacturer also advises to monitor cardiac function regularly.

Lithium has only a few parameters that the BNF states should be monitored; BMI, serum electrolytes, eGFR, and thyroid function every 6 months during treatment. Routine serum-lithium monitoring should be performed weekly after initiation and after each dose change until concentrations are stable, then every 3 months for the first year, and every 6 months thereafter.

Therefore, the 3 most appropriate bloods in this case are U&E for electrolytes and eGFR, TFTs for thyroid function, and a serum lithium level.

It is important that the sample for a serum lithium level is taken 12 hours after the dose to enable the concentration levels to be accurately monitored. In this case the timings of the last dose is stated in the question so it is a clinically relevant piece of information to include.

