



CASE STUDIES ON SERUM URIC ACID LEVEL

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Advanced Clinical Biochemistry II (MA 416)

Summer Semester

Week Two

17/08/2026



Outlines

- Definition of case study
- Advantages of case study
- Case one and its response
- Case two and its response

Objectives



- **At the end of this lesson, the students should be able to:**
- Understand the concept and aim of case studies.
- Study carefully and interpret clinical and laboratory-based potential cases.
- Make sense of the case(s) and provide potential, meaningful and relevant solution(s)



Introduction

- Case study has been described as an intensive, systematic health-wise investigation of a single individual, group, or community.
- It could even be an investigation of other units that the scientist (expert) examines.
- Case studies are also a record of clinical interactions which help us to frame questions for more rigorously designed clinical studies.

Diagnostic Reasoning: Laboratory-Based Case Studies in Clinical Chemis



Advantages

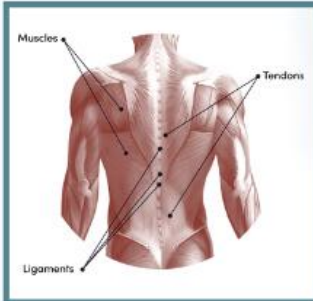
- Ability to see a relationship between phenomena, context, and people in health care delivery.
- Flexibility to collect data through various means and make sense of it.
- Ability to capture the context of participants and present it in real-life situations.
- Flexibility to be used at various points in a health care service delivery, including clinical pilot research.



Case 1

A 48-year-old manager was admitted with severe gassy pain in his lower left lumbar region and associated history of haematuria. He was overweight with a blood pressure of 165/105. Serum lipids on the admission showed triglyceride of 5.2 mmol/L (high). Total cholesterol of 7.2 mmol/L (high) and an HDL cholesterol of 0.8 mmol/L (low). Serum calcium was normal, but the uric acid was 0.75 mmol/L.

COMMON CAUSES OF SHARP, STABBING PAIN IN THE LOWER LEFT SIDE OF THE BACK



Soft Tissue Damage

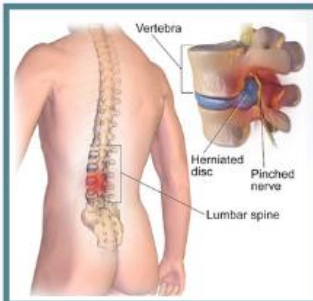
Overused, weak, or overstretched muscles and tendons in the lower back can become strained and cause pain. Similarly, a torn or overstretched ligament can result in a painful sprain.



Spinal Column Damage

Many conditions cause pain on the left side of the lower back. They include:

- Facet joint syndrome.
- Herniated lumbar disc
- Sacroiliac joint dysfunction



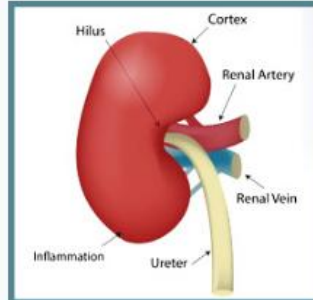
Herniated Disc

Improper lifting techniques, traumatic spinal injury, inactive lifestyle, and repetitive movement can lead to a herniated disc, more commonly known as a slipped disc.



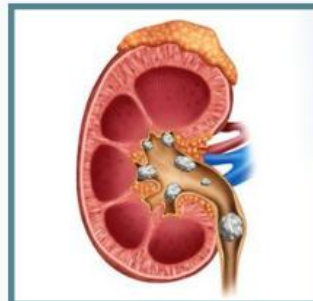
Sacroiliac Joint Dysfunction

Sacroiliac joint dysfunction is a condition when the joint that connects the hip bones to the lower back part of the spine moves abnormally and becomes inflamed.



Kidney or Urinary Infections

Kidney infections are usually caused by bacteria that infect the bladder and travel up to the kidneys. Other symptoms include foul-smelling urine, dark cloudy, or bloody urine, fever and painful urination.



Kidney Stones

The presence of stones in the kidney is associated with sharp, stabbing pain on the lower left side of the back and intense pain below the ribs, in the lower abdomen, above the buttocks, and in the groin.

Cont.

- Further questioning revealed an episode of severe pain in the joint of his left foot while holidaying in Spain.
- This was treated while abroad and resolved after a few days, but he could not remember what treatment had been given.
- **What are the possible complications the man is suffering from?**
- **What is the likely cause of this man's condition?**

Response to the case

- The clinical **history here**, together with the **high serum urate level**, all point towards the **diagnosis of primary gout**.
- The **joints** are the common body parts involved in **chronic gout attacks**.
- The **acute joint pain** coincides with his **holiday period**.
- Possibly he **overindulges** in **alcohol** and protein-rich foods that may well have precipitated the initial episode (**hematuria**).

Cont.

- The high serum urate is likely to be longstanding and has led to the formation of renal stones.
- A history of severe lumbar pain, colicky in nature and associated with hematuria, is classical for renal colic.
- Where possible, examination of any stones passed or removed should be undertaken to confirm that these are composed of uric acid.
- There is a known association of gout with hyperlipidemia, particularly a raised triglyceride.
- Gout is associated with hypertension and obesity.



Case 2

- During authorizing clinical results before release to the wards. The clinical biochemist on duty was surprised to find a serum uric acid level that was extremely low (undetectable on the lab analyzer). Initially, she felt that it was an analytical error and asked for the result to be repeated, again, the result was the same after the repeat. She rang up the hematology ward to discuss this result with the Specialist Registrar. Where she was told that the patient had acute lymphoblastic leukemia which was being actively treated.
- **Can you suggest a likely explanation for this finding?**



Response to the case

- It turned out that the patient had acute lymphoblastic leukemia which was being actively treated.
- In anticipation of possible problems arising from the excessive formation of urate (as a consequence of massive cell lysis), the patient was on treatment with rasburicase.
- Rasburicase is a genetically engineered urate oxidase (uricase) that converts uric acid to water-soluble allantoin.



Cont.

- The drug is used to treat hyperuricemia in adults and children with leukemia, lymphoma, or other cancer types who are receiving therapy.
- Recall that uric acid is a natural substance that can build up in the blood as tumors break down.
- The drug is so effective that could reduce the serum urate to virtually undetectable levels.
- Thus, the laboratory finding was a correct analytical result.

