Example of text from a Clinical Reasoning Scenario

HYPOVOLAEMIA & DEHYDRATION

Introduction

This scenario focuses on the care of an older person who experiences fluid and electrolyte imbalance. You will be introduced to Mr Cyril Smith and follow his journey from admission to day 3 post-operatively. Alterations in fluid status are common, manifest rapidly and can have potentially fatal consequences particularly in the elderly patient with numerous comorbidities. Maintaining the delicate fluid and electrolyte equilibrium of post-operative patients is an integral part of nursing care (Wotton & Redden, 2002). Fluid imbalance can lead to significant morbidity and mortality. However, effective clinical reasoning skills will help you to recognise and manage patient deterioration early, thus preventing adverse patient outcomes.

Suggested Pre-reading

LeMone, P., Burke, K. Dwyer, T., Levett-Jones, T., Moxam, L., Reid-Searl, K., Berry, K., Hales, M., Luxford, Y., Knox, N., Raymond, D (Eds.). (2011). *Medical-surgical nursing: Critical thinking in client care* (Australian ed). Frenchs Forrest, NSW: Pearson.

Chapter 4: Nursing care of clients having surgery

Chapter 10: Nursing care of clients experiencing altered fluid, electrolyte and acid-base balance

Chapter 26: Nursing care of clients with bowel disorders.

This resource was created as part of an ATLC Project titled Examining the impact of simulated patients and information and communication technology on nursing students' clinical reasoning

Setting the Scene

Mr Cyril Smith is a 72 year old man diagnosed with cancer of the colon. He sought medical treatment after noticing rectal bleeding. When questioned by his General Practitioner (GP) Mr Smith reported that he had also become aware of a change in his bowel habits, with occasional constipation and diarrhoea. Noting that Mr Smith was anaemic and that he had a family history of bowel cancer his GP performed a digit rectal examination. Although unable to identify a palpable rectal mass the GP referred him to a gastroenterologist and a colonoscopy was subsequently scheduled. The colonoscopy revealed left sided colon cancer and a bowel resection and was scheduled.

The following day Mr Smith's surgery proceeds without major complications.

It is now 0800 hours and Mr Smith is day one postoperatively. You are allocated Mr Smith to care for on the morning shift and you are provided with the following handover report:

1. CONSIDER THE PATIENT SITUATION

Morning handover report

We have Mr Smith in Room 2, he's 72 years old. He has bowel cancer and had a partial colectomy and formation of a colostomy. He's under Dr. Ng. His surgery was uneventful and he was stable throughout. He has a PCA, morphine, and an IV running at 84 mls per hour, he didn't have a good night though as his BP dropped and has needed 2 fluid challenges of 300mls each. He has an IDC on hourly measures and these are still a bit low. He has a bellovac and it has drained 300mls since yesterday. His wound has a dry dressing and it's intact. He has a drainage bag over the stoma - no drainage. His oxygen therapy is still at 6 litres a minute. He's tolerating the mask. His sats are OK. The obs are due again at 0800. He is on 4th hourly BGLs, type 2 diabetic-diet controlled, BGLs are acceptable. He lives alone, his wife passed away a couple a years ago. His daughter should be in later today.

Quick quiz !!

Answers p. 17-19

This handover report used a number of abbreviations and terminologies. Although this is useful for providing a lot of information rapidly, it can cause problems if the meanings are not clearly understood. Before progressing to the next stage of the clinical reasoning cycle test your understanding of abbreviations and terminologies by selecting the correct response for each of the identified terms:

1. **Partial colectomy:**

(a) removal of the colon
(b) removal of a section of the large bowel
(c) removal of section of the small bowel

2. PCA:
(a) patient care assistant
(b) pre cancer anaesthetic,
(c) patient controlled analgesia

3. IV:
(a) intra-operative thisapy
(b) intravenous thisapy

4. Fluid challenge:
(a) administration of a large amount of IV fluids over a short period of time under close monitoring to evaluate the patient's response
(b) rapid ingestion of water under close monitoring to evaluate the patient's response

5. Bellovac:
(a) urinary drainage system
(b) vacuum dressing
(c) vacuum drain

6. IDC:
(a) independent drainage catheter
(b) indwelling catheter
(c) intermittent drainage catheter

7. Stoma:
(a) An opening into the body from the outside created by a surgeon
(b) An opening out of the body from a fistula

8. BGL:
(a) blood glucose level
(b) basic saturation level
(c) blood gas levels

2. COLLECT CUES/INFORMATION

2 (a). Review current information

Now that you have considered the patient situation, the next stage of the clinical reasoning cycle is to collect relevant cues and information. Start by reviewing and thinking about Mr Smith's current observations:

Temperature	37
Pulse rate	112
Respiratory rate	22
Blood pressure	90/50
Oxygen saturation level	97%
Hourly urine output (average)	26mL/hr
BGL	4 mmol/L

2 (b). Gather new information

What other clinical assessment information do you need to collect? From the list below identify the **five** cues that you believe are **most** relevant to your assessment of Mr Smith at this time.

Hint … think back to the handover report you received.

(a) Appetite – nil
(b) Condition of oral mucosa – moth dry tongue furrowed
(c) Oral intake – sips only
(d) Pain – 3-4 using VAS scale
(e) Cognitive state – restless and anxious
(f) Colour – pale
(g) Skin turgor – poor
(h) Level of thirst – patient reports extreme thirst

Remember …When the correct cues are not acquired all of the actions that follow may be incorrect. Making judgments or decisions based on incomplete information is a leading cause of mistakes; and early subtle cues when missed can lead to adverse patient outcomes

2 (c). Recall knowledge

While cue collection involves reviewing current information and gathering new information it also requires you to **recall related knowledge.** This includes a broad and deep knowledge of physiology, pathophysiology, pharmacology, epidemiology, therapeutics, culture, context of care, ethics and law etc. as well as an understanding of evidence based practice. For students this can be challenging because it requires not only a strong foundation of knowledge but also the ability to synthesise and apply their knowledge to clinical situations which are often complex and fluid.

Quick quiz !!

To ensure that you have a good understanding of the key concepts related to fluid balance test yourself with the following questions.

1. **When a person's glomerular filtration rate drops:**
   (a) the anterior pituitary gland responds by secreting antidiuretic hormone
   (b) the adrenal glands respond by secreting renin
   (c) the adrenal glands respond by reducing the secretion of aldosterone
   (d) the juxtoglomerular cells in the kidney respond by secreting renin

2. **Antidiuretic hormone is secreted:**
   (a) by the anterior pituitary gland in response to increased serum albumin
   (b) by the posterior pituitary gland in response to increased serum osmolality
   (c) by the posterior pituitary gland in response to decreased serum sodium levels
   (d) by the collecting ducts of the kidneys in response to dehydration

3. **Oliguria:**
   (a) may be defined as an absence of urine production
   (b) is common after major surgery, and as such, is nothing for the nurse to be concerned about
   (c) is generally defined as more than 30mls per hour of urine excretion and is uncommon in the immediate post-operative period
   (d) is generally defined as less than 30mls per hour of urine excretion and, left untreated, may lead to acute renal failure

4. **When assessing a patient's fluid status which of the following groups include the *most* important nursing observations:**
   (a) weight, urine output, bowel sounds
   (b) Chvostek's sign, fluid intake, blood pressure
   (c) serum potassium, bowel sounds, urine output
   (d) urine output, blood pressure, weight

5. **Insensible fluid loss occurs through all of the following routes *except*:**
   (a) skin
   (b) lungs
   (c) kidneys
   (d) gastrointestinal tract

6. **Extracellular fluid loss refers to fluid loss from the interstitial fluid compartment and/or:**
   (a) intravascular compartment
   (b) intracellular compartment
   (c) retention of fluid in the plasma
   (d) loss of magnesium and albumin from the kidneys

7. **In assessing a patient with dehydration, you would expect the urine output to be:**
   (a) increased with elevated specific gravity
   (b) increased with decreased specific gravity
   (c) decreased with elevated specific gravity
   (d) decreased with decreased specific gravity

8. **A third-space fluid shift may occur as a result of all of the following *except*:**
   (a) hypoalbuminaemia
   (b) an allergic reaction
   (c) hypertension
   (d) hypovolaemia

Want to revise your knowledge of fluids and electrolytes? Try these activities:

http://www.wisc-online.com/objects/index_tj.asp?objID=NUR2903

http://www.wisc-online.com/objects/index_tj.asp?objID=NUR1203

http://www.wisc-online.com/objects/index_tj.asp?objID=NUR7808

http://www.wisc-online.com/objects/index_tj.asp?objID=NUR4004

3. PROCESS INFORMATION

3 (a). Interpret

The next step of the clinical reasoning cycle is to interpret the data (cues) that you have collected by careful analysis, all the while applying your knowledge about fluid balance. By comparing normal versus abnormal you will come to a more complete understanding Mr Smith's signs and symptoms.

Which of the following are considered to be within normal parameters for Mr Smith?

Remember … check the Glossary if you're not sure of what terms such as 'analyse' and 'synthesise' mean.

(a) Temperature 37°C
(b) Pulse rate 112 beats per minute
(c) Respiratory rate 22 breaths per minute
(d) Blood pressure 90/50

In the handover report a number of statements were made that need further clarification. Analyse each of the following statements and physiological parameters. Compare normal versus abnormal, and identify what you would consider 'normal' for Mr Smith at this time.

"His sats (SaO_2) are OK". A 'normal' oxygen saturation level for Mr Smith would be:

(a) 80-85%
(b) 85-90%
(c) 90-95%
(d) 95-100%

"He has an IDC on hourly measures and these are still a bit low." For Mr Smith a 'normal' urine output would be:

Hint … The formula for determining the normal urine output per hour is to multiply weight in Kg. by 0.5-1 ml.

(a) 35-40 mls per hour
(b) 60-80 mls per hour
(c) 10-20 mls per hour
(d) 45-60 mls per hour

"His BGLs are acceptable". A 'normal' BGL for Mr Smith would be:

(a) 4-8 mmol/L
(b) 2-4 mmol/L
(c) 1-3 mmol/L
(d) 8-10 mmol/L

3 (b). Discriminate

From the cues and information you now have you need to narrow down the information to what is most important. From the list below select four cues that you believe are most relevant to Mr Smith's fluid status at this time.

(a) Blood pressure
(b) Respiratory rate
(c) Temperature
(d) Pulse
(e) Condition of wound
(f) Oxygen saturation
(g) Condition of oral mucosa
(h) Level of consciousness
(i) Appetite
(j) Urine output
(k) Pain
(l) Colour

Research indicates that novice nurses tend wait until they have identified a patient problem before they search for cues – while experts practice more proactively, collecting a wide range of cues to identify and prevent possible patient complications (Hoffman, 2009).

3 (c). Relate

It is important to cluster the cues together and to identify relationships between them (based on the information you have collected so far). Label the following true or false:

This is where you begin to put together the pieces of the puzzle to make a coherent story.

(a) Mr Smith is hypertensive from excessive IV fluids
(b) Mr Smith is hypoxic as a result of the extended anaesthetic period
(c) Mr Smith is hypotensive from the preoperative bowel prep
(d) Mr Smith is hypertensive as a result of surgical blood loss
(e) Mr Smith is tachycardic from a third space fluid shift
(f) Mr Smith has a post operative wound infection
(g) Mr Smith is oliguric from hypotension
(h) Mr Smith has severe postoperative pain

3 (d). Infer

It is time to think about all the cues that you have collected about Mr Smith's condition, and to make inferences based on your analysis and interpretation of those cues. From what you know about your patient's history, surgery, and signs and symptoms (as well as your knowledge about fluid balance), identify which of the following inferences are correct: [select **the two** that apply]. Mr Smith is:

(a) Normotensive and bradycardic
(b) Hypertensive and tachycardic
(c) Febrile and normotensive
(d) Oliguric and tachycardic
(e) Hypertensive and afebrile
(f) Polyuric and hypotensive
(g) Hypotensvie and afebrile

3 (e). Predict

Now is the time to consider the consequences of your actions or inaction by predicting potential outcomes for your patient.

If you do not take the appropriate actions at this time what could happen if Mr Smith's fluid status is not corrected? [select **the four** that apply]

(a) Mr Smith could go into shock
(b) Mr Smith's condition will gradually improve over the next few days
(c) Mr Smith could go into acute renal failure (acute tubular necrosis)
(d) Mr Smith could develop pulmonary oedema
(e) Mr Smith could die
(f) Mr Smith could become hypoxic

4. IDENTIFY THE PROBLEM / ISSUE

At this stage you bring together (synthesise) all of the facts you've collected and inferences you've made to make a definitive nursing diagnosis of Mr Smith's main problems/issues. Select from the following list the correct nursing diagnosis for Mrs Smith:

(a) Hypervolaemia and dehydration
(b) Hypovolaemia and pulmonary oedema
(c) Dehydration and atelectasis
(d) Acute renal failure and pulmonary oedema
(e) Hypovolaemia and dehydration

Do you know the difference between hypovolaemia and dehydration?

Identify four factors (at least) that led to Mr Smith's deterioration

Hint … think about the causes and consequences of third space fluid shifts.

See 'Further Reading' for more information.

5. ESTABLISH GOALS

Before implementing any actions to improve Mr Smith's condition it is important to clearly specify what you want to happen and when.

From the list below choose the most important **short term** goals for Mr Smith's management at this time:

(a) For Mr Smith to be normotensive with urine output at least 30-40mls per hour within the next 24 hours.
(b) For Mr Smith to be normotensive with urine output greater than 80-100mls per hour within the next 2 hours.
(c) For Mr Smith to be normotensive with urine output at least 35-40mls per hour within the next 2-4 hours.
(d) For Mr Smith to be normotensive with urine output greater than 80-100mls per hour within the next 24 hours.

6. TAKE ACTION

Nursing 'action' is defined as "the behaviour following on from a judgment or decision" (Thompson & Dowding, 2002, p. 14). This stage of the clinical reasoning cycle is comprised practical skills, intellectual activities and communication skills. The nurse has to decide which part of the plan takes priority, who is best placed to undertake the nursing action/s, which procedures and policies are involved, who should be notified, and when.

Something to think about …

Too often documented abnormalities are not followed up by action. Thompson *et al* (2008) identified that half of avoidable arrests had clinical signs of deterioration recorded in the preceding 24 hours but were not acted on. Similarly, Goldhill (2001) reported that even critical alternations to the so called nursing basics such as pulse rate, respiratory rate, and oxygenation are often not acted upon. These undesirable responses to critical situations may occur when nurses do not have adequate clinical reasoning skills.

From the list below choose the six **most immediate actions** you should take at this stage:

Note: all of these are actions are important but you need to select those actions that are *most important* to the management Mr Smith's deteriorating condition!

(a) Notify Mr Smith's doctor of his condition
(b) Reassure patient
(c) Check that the IV cannula is not kinked or blocked
(d) Administer a fluid challenge and increase Mr Smith's IV fluid rate *as ordered*
(e) Check that the urinary catheter is not kinked or blocked
(f) Raise the foot of Mr Smith's bed
(g) Strictly monitor Mr Smith's input and maintain hourly urine measures
(h) Monitor Mr Smith's level of consciousness
(i) Monitor Mr Smith's pain score
(j) Monitor the condition of Mr Smith's drain, stoma and wound
(k) Monitor Mr Smith's vital signs and oxygen saturation level

In the table below match the rationales for care to the corresponding nursing action:

Nursing action	Rationale
Document all nursing observations and actions accurately and contemporaneously.	Anxiety and restlessness may indicate worsening fluid status
Daily weight (same scales, same clothes)	To monitor changes in fluid status
Check cognitive status regularly	To maintain psychosocial wellbeing
Monitor haemodynamic status closely	Sodium, potassium, urea and creatinine are important indicators of fluid status and renal function.
Regular position change	To manage dry mouth and tongue and to promote patient comfort.

Maintain patent IV access and monitor IV site regularly.	This is the best indication of fluid status.
Encourage oral fluids as ordered / tolerated by patient.	To increase fluid intake
Maintain oxygen thisapy via nasal prongs or Hudson mask and hourly oxygen sats.	To ensure adequate oxygen delivery
Check serum electrolytes as ordered.	To identify improvement or deterioration in Mr Smith's condition
Reassure patient	To ensure clear, accurate and timely communication between all health professionals caring for Mr Smith.
Provide regular oral care	To prevent pressure areas due to dry skin.
Check specific gravity of urine	To ensure fluids are administered as ordered

7. EVALUATE

It is now two hours since Mr Smith was given a fluid challenge and had his IV rate increased to 125 mL/hr. Each of Mr Smith's signs and symptoms provide you with data to make a determination of whether or not these interventions have been effective and whether his condition is improving.

Rate each of the following signs and symptoms as either:

- unchanged
- improving
- deteriorating

Cognitive status	Patient restless and anxious
Level of thirst	Patient reports some thirst
Pulse	90
Urine output	36mL/hr
Oral mucosa	Mouth is dry and tongue furrowed
Oral intake	Tolerating sips of water
BP	110/70
Colour	Pale
Skin condition	Skin turgor poor

You now need to synthesize these parameters to decide whether Mr Smith's fluid status has improved overall. Which of the following statements are most correct:

(a) Mr Smith's fluid status has improved significantly
(b) Mr Smith's fluid status has not improved and you need to contact the doctor again
(c) Mr Smith's fluid status has improved significantly but still requires careful monitoring
(d) Mr Smith's fluid status has improved slightly but still requires careful monitoring. You will need to contact the doctor again if further improvement is not seen in the next

4 hours.

(e) Mr Smith's fluid status has not improved but you will monitor his condition carefully for the next four hours.

8. REFLECT

The final stage of the clinical reasoning cycle is 'reflection'. Reflection in this context refers to the process of 'looking back' with careful consideration of the experience; and a critical review of practice with a view to improvement.

Reflect on your learning from this scenario and consider the following questions:

What are three of the most important things that you have learnt from this scenario?

What nursing actions may have prevented Mr Smith's deterioration?

What actions will you take in clinical practice as a result of your learning from this scenario?

FURTHER READING

Levett-Jones, T., Hoffman, K. Dempsey, Y. Jeong, S., Noble, D., Norton, C., Roche, J., & Hickey, N. (2010). The 'five rights' of clinical reasoning: an educational model to enhance nursing students' ability to identify and manage clinically 'at risk' patients. *Nurse Education Today*. 30(6), 515-520.

Redden,M. & Wotton, K. (2002).Third-space fluid shift in elderly patient undergoing gastrointestinal surgery. Part 1: Pathophysiological mechanisms. Contemporary Nurse. 12, 275-283.

Wotton, K. & Redden,M. (2002).Third-space fluid shift in elderly patient undergoing gastrointestinal surgery. Part 2: Nursing assessment. Contemporary Nurse. 13, 50-60.

Answers

1.Consider the patient situation

Quick quiz: 1. b; 2. c; 3. b; 4. a; 5. c; 6. b; 7. a; 8. a.

2 (b). Gather new information

Five most relevant cues: b; c; e; g; h;

2 (c). Recall knowledge

Quick quiz: 1. d; 2. c; 3. d; 4. d; 5. c; 6. a; 7. c; 8. d.

3. Process Information

3 (a). Interpret
Which of the following are considered to be within normal parameters for Mr Smith? a; c.

A 'normal' oxygen saturation level for Mr Smith would be: d (95-100%)

A 'normal' urine output for Mr Smith would be: a (35-40 mls per hour). As Mr Smith is elderly his body's compensatory mechanisms are less effective at excreting excess fluids. For this reason 35-40mL per hour is considered adequate but his hourly urine output should still be monitored very carefully.

A 'normal' BGL for Mr Smith would be: a (4-8 mmol/L)

3 (b). Discriminate
Cues most relevant to Mr Smith's fluid status at this time are: a; d; g; j.

3 (c). Relate

(a) False
(b) False
(c) True
(d) False
(e) True
(f) False
(g) True
(h) False

3 (d). Infer
Correct inferences: d; g.

3 (e). Predict
What could happen if Mr Smith's fluid status is not corrected? a; c; e; f.

4. Identifying the problem / issue
Correct nursing diagnosis: e.

Factors that contributed to Mr Smith's deterioration:

- Mr Smith was given two picopreps on the night before his surgery. Pico preps cause osmotic diarrhoea and many litres of fluid can be lost from the circulating volume through the wall of the intestine as the bowel is evacuated. The major electrolytes sodium and potassium are also lost in this way
- Following routine protocol Mr Smith was nil orally from 0600 on the day of surgery to prevent the risk of aspiration during surgery. Being nil orally for this extended period of time contributed to his hypovolaemia.
- Mr Smith was unable to tolerate the clear fluid diet he had been ordered to off-set the fluid losses from the pico prep.
- The first stage of wound healing is the inflammatory stage. During this stage thise is increased capillary permeability to allow fluid and molecules that assist in haemostasis, prevent infection and promote healing of the wound, to leave the blood stream and surround the site of trauma. A large surgical area such as Mr Smith's results in significant third space fluid shift which further depletes the intravascular volume.
- Blood loss during surgery and through drainage from the bellovacs further depleted the intravascular volume.
- Mr Smith's hypotension caused decreased glomerula filtration rate and resulted in decreased urine output.
- A hypovolemic stage is not unusual after major surgery. For most people this lasts 24-72 hours or until IV fluid replacement and the body's own compensatory mechanisms have been effective in increasing circulating volume. During this stage it is essential to monitor your patient's condition carefully as any deterioration could be critical.

5. Establish goals

The most important **short term** goals for Mr Smith's management at this time: c

6. Take action

Six most immediate nursing actions: a; c; d; f; g; k

Explanation for incorrect responses:

- Reassure patient [Important, however not an immediate action]
- Monitor the condition of Mr Smith's drain, stoma and wound [Important, however not an immediate action]
- Check that the urinary catheter is not kinked or blocked [Catheter blockage is not likely as there is some urine output]
- Monitor Mr Smith's level of consciousness [The cues provide no evidence of altered consciousness (at this stage)]
- Monitor Mr Smith's pain score [Important, but not related to current signs and symptoms]

Nursing action	Rationale
Document all nursing observations and actions accurately and contemporaneously.	To ensure clear, accurate and timely communication between all health professionals caring for Mr Smith.
Daily weight (same scales, same clothes)	This is the best indication of fluid status.
Check cognitive status regularly	Anxiety and restlessness may indicate worsening fluid status
Check serum electrolytes as ordered	Sodium, potassium, urea and creatinine are important indicators of fluid status and renal function.
Regular position change	To prevent pressure areas due to dry skin.
Maintain patent IV access and monitor IV site regularly.	To ensure fluids are administered as ordered
Encourage oral fluids as ordered / tolerated by patient.	To increase fluid intake
Maintain oxygen thisapy via nasal prongs or Hudson mask and hourly oxygen sats.	To ensure adequate oxygen delivery
Monitor haemodynamic status closely.	To identify improvement or deterioration in Mr Smith's condition
Reassure patient	To maintain psychosocial wellbeing
Provide regular oral care	To manage dry mouth and tongue and to promote patient comfort.
Check specific gravity of urine	To monitor changes in fluid status

7. Evaluate

• unchanged	Cognitive status	Patient restless and anxious
• improving	Level of thirst	Patient reports some thirst
• improving	Pulse	90
• improving	Urine output	30mL/hr
• unchanged	Oral mucosa	Mouth is dry/ tongue furrowed
• unchanged	Oral intake	Tolerating sips of water
• improving	BP	110/70
• unchanged	Colour	Pale
• unchanged	Skin condition	Skin turgor poor

Has Mr Smith's fluid status has improved overall? d

REFERENCES

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Hoffman. K., Aitken, L. and Duffield, C. (2009). A comparison of novice and expert nurses' cue collection during clinical decision-making: Verbal protocol analysis. International Journal of Nursing Studies. 46(10), 1335-1344

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Levett-Jones, T., Hoffman, K. Dempsey, Y. Jeong, S., Noble, D., Norton, C., Roche, J., & Hickey, N. (2010). The 'five rights' of clinical reasoning: an educational model to enhance nursing students' ability to identify and manage clinically 'at risk' patients. *Nurse Education Today*. 30(6), 515-520.

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