Antineoplastic Chemotherapy Infusion Reactions: Tumour Lysis Syndrome

Site Applicability

PHC

Practice Level

Basic: Registered Nurses

Need to Know

There are 3 common infusion reactions that a person may experience as a result of cancer chemotherapy drug treatment:

1. Allergic Reactions
   - Hypersensitivity
   - Anaphylaxis
2. Cytokine Release Reactions
3. Tumor Lysis Syndrome

The three kinds of reactions are discussed in separate practice standards – this standard discusses tumor lysis syndrome.

Tumor Lysis Syndrome

Tumor lysis syndrome (TLS) is an oncologic emergency that is caused by tumor cell lysis resulting in the release of massive quantities of intracellular contents (electrolytes, uric acid) into the systemic circulation. The metabolic consequences include hyperkalemia, hyperphosphatemia, secondary hypocalcemia, and hyperuricemia which can lead to acute kidney injury, cardiac arrhythmias, seizures, and death.

TLS can happen as a result of treatment (chemotherapy or radiation) or spontaneously.

Because of the rapid division rates and sensitivity to therapy, hematological cancers constitute the vast majority of TLS.

Risk Factors for TLS

Patient Related Risk Factors:

- Dehydration; oliguria or anuria
- Renal dysfunction
- High sensitivity to treatment

Disease Related Factors:

- Large tumor burden
- Malignancy with a high proliferative rate - lymphoma or leukemia with elevated baseline LDH
- Extensive lymph node involvement
- Increased WBC count

Treatment Related Factors:

- Initiation of cytotoxic chemotherapy
- Total body irradiation
- Glucocorticoid therapy

Symptoms

TLS presents via biochemical abnormalities and symptoms largely reflect these disturbances:

- Hypocalcemia
- Hyperkalemia (appears 6 to 72 hours after initiation of treatment)
- Hyperphosphatemia (appears 24 to 48 hours after treatment starts)
- Hyperuricemia (appears 48 to 72 hours after treatment starts)

Signs and symptoms most commonly present 24 to 48 hours after the initiation of treatment:

- Nausea and vomiting
- Muscle spasm and cramps
- Cardiac arrhythmia
- Decreased urine output
- Mental changes
- Syncope
- Lethargy

Prophylaxis

- Manage possible hypovolemia before the start of cancer targeted therapies
- Aggressive hydration prior to starting therapy (usually 24 to 48 hours before) – to improve renal perfusion and glomerular filtration, and induce a high urine output to minimize the likelihood of uric acid or calcium phosphate precipitation in the tubules
- Hypouricemic agents – allopurinol or rasburicase
- Reduce potassium and phosphorus in diet

Protocol

Assessment

Monitor:

- Urine output
- Fluid status
- Serial electrolytes and serum uric acid – lab tests every 4 to 12 hours
- ECG if hyperkalemic

Interventions

- Hyperkalemia:
    - Oral potassium-lowering agents - sodium polystyrene sulfate
    - Parenteral potassium-lowering agents - insulin and glucose; calcium gluconate
    - Reduced potassium diet
- Hypocalcemia:
    - Symptomatic hypocalcemia should be treated with calcium at the lowest doses required to relieve symptoms
- Patients who do not respond to prophylactic management may require hemodialysis to manage electrolyte abnormalities and hyperuricemia, and treat renal failure associated with TLS. The prognosis for complete recovery of renal function is excellent if dialysis is initiated early to rapidly reduce serum uric acid and phosphate concentrations.
- Antiemetics for nausea

Documentation

1. Nursing documentation as per unit procedure: record assessment, nursing interventions, patient's response and vital signs
2. Medication Administration Record—any medications given

Patient and Family Education

Patients and families must be informed of:

- Why the patient is at risk for TLS
- Potential side effects of the drugs, including the risk of a reaction and the associated symptoms
- The rationale for the implemented preventative measures
- The symptoms of TLS. It is essential that patients understand the importance of reporting any of the following symptoms:

• Dyspnea • Chest pain • Nausea • Weakness • Lethargy	• Muscle cramps and/or twitching • Mental changes • Syncope • Decreased urine output (voiding less or in lesser amounts that normal)

Ensure that patient and family questions have been answered and that their concerns have been addressed. Provide emotional support to the patient and family.

Related Documents

1. B-00-13-10201 – Chemotherapy: Infusion Reactions – Cytokine Release Syndrome
2. B-00-13-10153 – Chemotherapy: Infusion Reactions – Hypersensitivity Reaction
3. B-00-13-10148 – Administration of Parenteral Antineoplastic Drugs (Hematology)
4. BD-00-12-40091 - Anaphylaxis: Initial Emergency Treatment
5. PHC-PH581 –Chemotherapy Hypersensitivity Pre-Printed Orders

References

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4 Sørensen, N; Jensen, P; Clasen-Linde, E; Moesgaard Larsen, J & El-Galaly, T (2018). Fatal cardiac arrhythmia caused by tumor lysis in a patient with diffuse large B-cell lymphoma upon start of R-CHOP. Clinical Case Reports 6(3)

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