Ethacrynic Acid Administration: Intravenous Route

Purpose

To provide education on the administration of ethacrynic acid intravenous route for Nuclear Medicine technologists, prior to completion of competency assessment.

Site Applicability

This document is applicable to all Nuclear Medicine Lower Mainland Medical Imaging (LMMI) departments within Fraser Health (FH), Providence Health Care (PHC), Provincial Health Services Authority (PHSA) and Vancouver Coastal Health (VCH).

Practice Level

Profession	Skill
Medical Radiation Technologists (MRT) certified in: • Nuclear Medicine	Core competency skills within their scope of practice and job description or with additional education and competency assessment expectations of the role are met: • Delegation to administer medications • Peripheral intravenous needle insertion

Need to know

A diuretic renal scan is a non-invasive, widely available Nuclear Medicine (NM) procedure that can evaluate renal function and urine transit in a single procedure and provides useful information about renal obstruction status. This test is based on a high endogenous rate of urine flow stimulated by the administration of furosemide (Lasix).

Furosemide may trigger life-threatening sulfonamide cross hypersensitivity reactions in some patients, posing a dilemma in patients who need diuretic renal scintigraphy. Ethacrynic acid is an alternative to furosemide for patients with a severe sulfonamide (Sulfa) allergy with no adverse clinical impact.

The administration of medications by NM technologists is by delegation from the supervising NM physician to the NM technologist. The delegation does not absolve the physician of responsibility for the care of the patient; it merely widens the circle of responsibility for the safe execution of the procedure.

The Delegated Medical Act Policy "MINM-121031-01_Administration of Medications by Nuclear Medicine Technologists" (DMA) outlines the roles and responsibilities of the delegation and lists in Appendix B of the document, the approved medications.

This education is supplemental to the mandatory requirements for the DMA. Competency assessment for the safe delegation of intravenous (IV) injection of Ethacrynic acid from the NM physician to the NM technologist must be assessed.

Procedure

In the interest of safety and quality patient care, the NM physician or medical delegate must be available for consultation prior to administration, during administration of intravenous Ethacrynic acid and immediately following to attend to any reaction or adverse event that may occur.

Requirements for NM technologist competency certification in the IV administration of Ethacrynic acid:

1. Complete the education in:
   a. Appendix A: Ethacrynic Acid (Edecrin®; Sodium Edecrin)
   b. Appendix B: Medication Preparation and Administration
2. Complete the additional Required Readings.
3. Review NM Site Protocol: Diuretic Renal Scan with Ethacrynic Acid
4. Ensure current certificate of completion of the online LHUB Course https://learninghub.phsa.ca/Courses/24122/lmmi-nuclear-medicine-technologist-competency-for-administration-of-medications
5. Complete Ethacrynic Acid Administration Intravenous Route: Competency Assessment Tool
6. NM physician signs the DMA certificate of competency for delegation of Ethacrynic acid to the NM technologist
7. Annual competency assessment or more frequent at the discretion of the supervising NM physician or delegated NM technologist.

Required Readings

Diuretic Renal Scintigraphy in Patients with Sulfonamide Allergies: Possible Alternative Use of Ethacrynic Acid. Nguyen, Ba D, et al, J Nuclear Medicine Technology 2015; 43:239–241. http://tech.snmjournals.org/content/43/4/239.full

EDECRIN (Ethacrynic Acid) Product Monograph, Valeant Canada LP. https://pdf.hres.ca/dpd_pm/00028365.PDF

Related Documents

- Ethacrynic Acid Administration Intravenous Route: Competency Assessment Tool

References

Nguyen, Ba D, et al, Journal of Nuclear Medicine Technology 2015; 43:239–241. Diuretic Renal Scintigraphy in Patients with Sulfonamide Allergies: Possible Alternative Use of Ethacrynic Acid. *http://tech.snmjournals.org/content/43/4/239.full*

Product Monograph: Intravenous SODIUM EDECRIN® (ethacrynate sodium for injection, USP) Valeant Canada LP February 28 2012. Revised September 26, 2014. *https://pdf.hres.ca/dpd_pm/00028365.PDF*
LEXICOMP (Lexi-Drugs) *http://online.lexi.com/lco/action/doc/retrieve/docid/patch_f/6863*

Canadian Association of Medical Radiation Technologists. (n.d) *CAMRT Scope of Practice. https://www.camrt.ca/mrt-profession/description-of-practice-2/*

Canadian Association of Medical Radiation Technologists. (n.d) *Code of Ethics Medical Radiation Technologists. https://www.camrt.ca/mrt-profession/professional-resources/code-of-ethics/*

College of Physicians and Surgeons of British Columbia. Diagnostic Imaging Accreditation Standards Medical Staff – Delegated Medical Acts. *https://www.cpsbc.ca/files/pdf/DAP-AS-Diagnostic-Imaging.pdf*

Molnar J, Somberg JC, American Journal of Therapeutics 16, 86–92 (2009). The clinical pharmacology of ethacrynic acid.

Parenteral Drug Therapy Manual FHA
https://pulse/clinical/pharmacy/Documents%20%20PDTM%20Monographs/ethacrynic%20acid.pdf

Parenteral Drug Therapy Manual – VCH-PHC
http://pdtm.vch.ca/Documents/ethacrynic%20acid%20NEW.pdf

Appendices

- Appendix A: Ethacrynic Acid (Edecrin®; Sodium Edecrin)
- Appendix B: Medication Preparation and Administration

APPENDIX A: Ethacrynic Acid (Edecrin®; Sodium Edecrin)

Pharmacological Classification

Ethacrynic Acid is a Saluretic[1]-Diuretic[2] agent. It is a loop type diuretic agent with marked potency and rapid onset of action. It is chemically unrelated to other diuretics because all the other loop diuretics have a sulfa moiety.

It comes in two forms:

- Intravenous SODIUM EDECRIN® (ethacrynate sodium for injection, USP) 50 mg equivalent to ethacrynic acid. It is in the form of a lyophilized powder for injection, which requires reconstitution prior to administration.
- EDECRIN® (ethacrynic acid tablets, USP) 25 mg

Diuretic Renal Scans use Intravenous SODIUM EDECRIN® injection.

Mechanism of Action

Ethacrynic acid inhibits reabsorption of sodium and chloride in the ascending loop of Henle and distal renal tubule, interfering with the chloride-binding cotransport system, thus causing increased excretion of water, sodium, chloride, magnesium and calcium.

Pharmacodynamics/Kinetics

Rapid onset of action following IV administration is 5 minutes.

Peak effect following IV administration is 30 minutes.

Contraindications

- in patients with anuria
- in patients with hypotension
- in patients with severe watery diarrhea
- in patients with dehydration
- in patients with hyponatremia
- in patients with severe hypokalemia

Other

Creatinine has been found to be a fairly reliable indicator of kidney function. Elevated creatinine level signifies impaired kidney function. Standard blood tests routinely check the amount of creatinine in the blood.

Part of the clinical workup by the ordering physician may include serum creatinine, done within approximately 1 month.

Adverse Effects

Hypersensitivity reactions are rare but can occur. It is important to question patients for any previous reactions to Ethacrynic acid or any other medication allergies. Ensure appropriate documentation is completed and the supervising NM physician is aware of any known allergies.

- **Monitoring** includes blood pressure and pulse if symptomatic
- **Extravasation** may cause local irritation or pain therefore a large vein in forearm is preferred. If extravasation occurs, use alternate injection site if a second dose is required.

- **Uncommon adverse effects**
    - Too rapid injection may cause deafness, tinnitus, vertigo
    - Hypotension

Definitions:

"**Diuretic**" means medication designed to increase the amount of water and salt expelled from the body as urine. A diuretic medication is also referred to as a water pill. There are three types of prescription diuretics: thiazides, loop or potassium-sparing.

"**Saluretic**" means a drug that promotes excretion of salt in the urine. Relating to or causing excretion of salt.

APPENDIX B: Medication Preparation and Administration

Reconstitution:

- Ethacrynic acid is available as 50 mg vial of lyophilized powder for reconstitution
- Reconstitute 50 mg vial with 50 mL D5W (5% Dextrose) to provide 1 mg/mL solution. Add D5W slowly to avoid foaming
- Discard if solution is hazy or opalescent
- Reconstituted solutions must be used within 24 hours. Store at room temperature

Dosage:

- Dosage = 25 mg Ethacrynic acid.
- Withdraw 25 mL of Ethacrynic acid solution (25 mg X 1mg/mL = 25 mL). Label appropriately.
- Draw up 25 mL D5W (5% Dextrose) into a 60mL syringe.
- Add Ethacrynic acid (25mL) to the 60 mL syringe. The final volume of the syringe will be 50 mL and the final concentration of the syringe will be 0.5mg/mL Ethacrynic acid in Dextrose. Label patient dosage appropriately

Administration:

- Administer intravenously (IV) over 15 minutes using a Syringe Pump
- Set the infusion rate using option 3) VOLUME/TIME
  Enter VOLUME = 50 mL
  Enter TIME = 15 Minutes
  (Infusion Rate 3.33 mL/min)
- If extravasation occurs, terminate immediately and consult with the NM physician. If a second dose is ordered by the NM physician, it is recommended to use a new injection site to avoid possible thrombophlebitis

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	1.0	19-MAY-2023	Initial release	Rhonda Hollerbaum, NM RPL
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