RESONIUM - A

Introduction

Resonium A is **sodium polystyrene sulfonate.**

It is a cation exchange resin prepared in the sodium phase. (A cation exchange resin prepared in the **calcium** phase is also available).

Resonium A is a non-urgent treatment for the removal of potassium from the body. It takes several hours for full effect.

See also separate document on Hyperkalemia, (Renal and Electrolytes Folder).

Preparation

Resonium A contains 99.93% sodium polystyrene sulfonate as a finely ground powder.

The sodium content is approximately 4.1mmol (100 mg) per gram of Resonium A.

Presentation is a powder of 454 grams

Once reconstituted, Resonium A is a cream to light brown coloured suspension in which small white particulates may remain visible.

Mechanism of Action

The potassium binders are artificial resins that exchange their bound cations (Ca^{2+} or Na^{+}) for potassium ions in the intestine. For the most part, this action occurs in the **large** intestine, which excretes potassium to a greater degree than does the small intestine.

The resin with the **bound potassium** is then excreted

It therefore **removes potassium from the body** by exchanging it within the gut for sodium via and so in effect has a **gut "dialysing" effect.**

Pharmacokinetics

Absorption:

- Resonium A is for oral or rectal administration only.
- Sodium polystyrene sulfonate is **not** absorbed from the gastrointestinal tract.

Distribution:

- Sodium polystyrene sulfonate is confined to the GIT lumen.

Metabolism and excretion:

- Sodium polystyrene sulfonate is not metalized and is excreted via the GIT

Pharmacodynamics

Sodium polystyrene sulfonate has an *in vitro* exchange capacity of approximately 3.1 mmol of potassium for every one gram of resin.

The efficiency of potassium exchange in vivo however is somewhat unpredictable and variable and the actual amount of potassium bound is closer to **potassium 1 mmol per one gram of resin.**

It delivers around 2 to 3 mmol of sodium

Indications

- Hyperkalemia

Note however that Resonium A is the **not** method of choice for **urgent** lowering of potassium levels, (**see Hyperkalemia Document, Renal and Electrolytes Folder**).

Contraindications/ Precautions

Contraindications and Precautions include:

- Obstructive bowel disease.
- History of hypersensitivity to polystyrene sulfonate resins.
- Serum potassium levels less than 5 mmol/L.
- Cases where excessive sodium load could be a potential problem:
    - ♥ i.e. severe congestive heart failure, severe hypertension, renal damage or marked oedema.

Pregnancy

Resonium A is classified as a category B2 class drug with respect to pregnancy. [3]

Category B2 drugs are those drugs which have been taken by only a limited number of pregnant women and women of childbearing age, without an increase in the frequency of malformation or other direct or indirect harmful effects on the human fetus having been

observed. Studies in animals are inadequate or may be lacking, but available data show no evidence of an increased occurrence of fetal damage

The administration of Resonium A in pregnancy is not advised unless the potential benefits are thought to outweigh any potential risks.

Breastfeeding

No data are available regarding the use of polystyrene sulfonate resins in lactation. The administration of Resonium A during breastfeeding therefore, is not advised unless the potential benefits are thought to outweigh any potential risks.

Adverse Effects

These include:

- GIT upset:
    - ♥ Gastric irritation, with anorexia/ nausea/ vomiting
    - ♥ Constipation or diarrhoea can occur.
    - ♥ Concomitant use of sorbitol will increase the risk of GIT side effects, which can be significant, (e.g. necrosis). Concomitant use of sorbitol is **not** recommended.
- Electrolyte disturbances:
    - ♥ Hypokalaemia:
        - ♥♥ It is important to determine serum potassium levels frequently when indicated especially in patients on digoxin.
    - ♥ Hypomagnesaemia/ hypocalcaemia:
        - ♥♥ Like all cation exchange resins, Resonium A is not totally selective for potassium only. Small amounts of other cations such as magnesium and calcium can also be lost during treatment. Accordingly, patients receiving Resonium A should be monitored for all applicable electrolyte disturbances.
    - ♥ Excess sodium load/ hypernatremia
- Aspiration may lead to bronchopulmonary complications.

Dosing

Resonium A treatment takes several hours for full effect.

The standard dosing for Resonium A is: [1]

- Sodium polystyrene sulfonate 15 grams (suspended in 45 to 60 mL of water) orally, 3 or 4 times daily

Or

- Sodium polystyrene sulfonate 30 to 50 grams (suspended in 150 mL of water or 10% glucose) rectally as a retention enema, daily.

Do not mix with fruit juices (as they contain potassium).

Once the mixture has been prepare it should be used straight away. If it needs to be stored, it should be stored for no longer than 24 hours.

Therapy should be discontinued once serum potassium levels falls below 5 mmol/L.

Children:

For acute hyperkalaemia the dose is generally 1 gram /kg daily in 3 or 4 divided doses.

Calcium polystyrene sulfonate: [1]

In cases where excessive sodium load could be a potential problem, a **calcium exchange resin** can be used instead.

Give:

- Calcium polystyrene sulfonate 15 grams (suspended in 45 to 60 mL of water) orally, 3 or 4 times daily

Or

- Calcium polystyrene sulfonate 30 to 50 grams (suspended in 150 mL of water or 10% glucose) rectally as a retention enema, daily.

Note however that a *calcium* exchange resins should *not* be used if the patient has a condition that is associated with hypercalcaemia.

References

1. eTG - March 2014.

2. Resonium A in Australian Medicines Handbook, October 2013

3. Resonium A in MIMs April 2014

Dr J. Hayes
June 2014.