PO0283 | A Novel Fast-Acting Iron Sucrose Formulation for CKD Patients with Iron Deficiency Anemia

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Background

- Intravenous (IV) iron is commonly used to treat iron deficiency anemia in patients with CKD
- Several IV iron formulations are currently available: iron dextran, sodium ferric gluconate, ferumoxytol, ferric carboxymaltose, and iron sucrose (FeS)
- The selection of which IV iron to use is dependent on the required frequency of administration, length of administration, tolerability, and cost
- RBT-3 is a novel iron sucrose formulation with desirable physicochemical characteristics and a safety profile that is well tolerated in both healthy volunteers and subjects with Stage 3/4 CKD

Methods

- Analytical testing examined the physicochemical profile of RBT-3 in comparison to commercially available FeS
- The following properties were evaluated:
  - Molecular weight
  - Particle size
  - Surface charge
  - Iron core size
  - Total iron content
  - Fe2+ content
  - Labile iron content
  - Water content

Results

	RBT-3
Particle size, nm	15.30
MW, Da	34,355
Iron core, nm	2.41
Zeta potential, mV	-10.16
Total Iron (ICP-OES), wt%	1.07
Total Fe (titration), mg/mL	11.87
Labile Fe, %	1.48
Fe2+, %	3.4
Total Carbon, %	7.69
Amorphous material, %	94.8

- The MW of RBT-3 suggests rapid uptake into the reticuloendothelial system
  - A low MW yet similar particle size to commercial iron sucrose suggests low density/low crystallinity of RBT-3
- A smaller nanoparticle core but same overall size indicates clearance rate is similar between RBT-3 and commercial iron sucrose
- Negative zeta potential and low quantity of labile Fe suggests low potential for cytotoxicity
- The low quantity of Fe2+ suggests less generation of oxidative stress will result from RBT-3
- Thermogravimetric analysis indicates a larger weight loss at <200C, which correlates to a higher water content and increased solubility

Clinical Experience

- In a Phase 1b study of RBT-3, 18 subjects were enrolled:
  - 6 subjects (3 healthy volunteers and 3 subjects with CKD) randomized to receive a single dose of RBT-3 at 120, 240, or 360 mg
  - Mean age: 60.3 years; 10 females
- Ferritin levels upregulated through 168 h (7 days) post-treatment
  - Plasma ferritin increased within 2 h of treatment in a dose-dependent manner - statistical significance achieved by 8-12 h
  - Urine ferritin increased by 24 h, with a significant increase in heavy chain ferritin
- Hemoglobin levels increased by 24 h and continued to be higher than baseline through 96 h post-treatment
- No treatment-related adverse events (AEs) were observed
- No serious AEs (SAEs) were reported

Conclusions

- RBT-3 is a novel, well-tolerated, fast-acting iron sucrose formulation
- This is the first report of ferritin level increases within only 2 h by an iron formulation
- The rapid increase in ferritin may have been the result of rapid cellular processing of RBT-3