Characterization of Oral Iron Therapy Prior to Initiation of Intravenous Iron in Pregnancy

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Background

- Iron deficiency is common in pregnancy due to physiologic changes and requirements for fetal and placental development.
- Hemoglobin (Hgb) and ferritin (ft) are known to decrease in pregnancy, for example one study reported Hgb 129 g/L to 117g/L and ft 37 mcg/L to 7.6 mcg/L
- First line treatment includes oral iron therapy
  - Studies with ferrous salts in pregnancy have shown a significant increase in Hgb and ft by 4 to 12 weeks of therapy
- Recently, an increase in polysaccharide iron complex (PIC) was observed with a subsequent increase in IV iron use
- Current PIC data in non-pregnant populations:
  - Two studies show minimal improvement in Hgb and ft by 8 to 12 weeks of therapy
- There is limited information regarding the efficacy and safety of PIC in pregnancy

Methods

- **Design:** Chart Review
- **Inclusion:** Pregnant patients who have received IV iron according to their pharmacy records between January 2010 and September 2016 in the Family Birthing Unit at Surrey Memorial Hospital or the Medical Daycare Unit at Jim Pattison Outpatient Care and Surgery Center
- **Primary Objective:** To characterize oral iron preparation use prior to IV iron initiation during pregnancy in terms of product, prescribed dose and duration of therapy
- **Secondary Objective:**
  - Determine rationale behind escalation to IV iron initiation during pregnancy
  - Characterize any adverse events documented from oral or IV iron use during pregnancy
  - Describe the trend of Hgb, ft, mean corpuscular volume (MCV), percent transferrin saturation (Tsat) after oral iron initiation and prior to IV iron initiation

Results

Patient Characteristic	(n=38)
Median Age, years (range)	30 (23-38)
Gastrointestinal Disorder, n (%)	23 (60.5)
Nausea/Vomiting/Hyperemesis	14 (36.8)
Gastrointestinal malabsorption	10 (26.3)
Alpha/Beta Thalassemia, n (%)	3 (7.6)
Previous IDA, n (%)	23 (60.5)
Acid Suppressing Medications*, n (%)	12 (31.5)
Antacid	6 (15.8)
Histamine-2 Receptor Antagonist	11 (2.9)
Proton Pump Inhibitor	2 (5.3)
Prenatal Vitamin, n (%)	34 (89.5)

Table 1: Patient Baseline Characteristics
*Patients took more than 1 acid suppressor
†Gastrointestinal (GI) malabsorption: celiac disease, gastric bypass, GI bleed, gastroparesis & ulcerative colitis

Reason (n=38)	Number of Cases – Documented (%)
PO Intolerance	5 (13.2)
Ferrous Gluconate	0
Ferrous Fumarate	0
PIC	2 (5.3)
Heme Iron	0
Unknown	3 (7.9)
Severe Anemia - Hgb <70g/L	2 (5.3)
Not prescribed oral iron due to gastrointestinal disorder	8 (21.1)
Anemic and Close to Term as per MD	2 (5.3)
No Improvement from Oral Iron†(n=28)	21 (75)
Ferrous Gluconate	3 (10.7)
Ferrous Fumarate	1 (3.6)
PIC	11 (39.3)
Heme Iron	2 (7.1)
Unknown	4 (14.3)
Others*	4 (10.5)

Table 2: Reasons for Escalation to IV Iron
*Others as per healthcare provider: complete placenta previa, stage 3 CKD, non-adherence, celiac disease
†Only 28 out of 38 patients received oral iron therapy

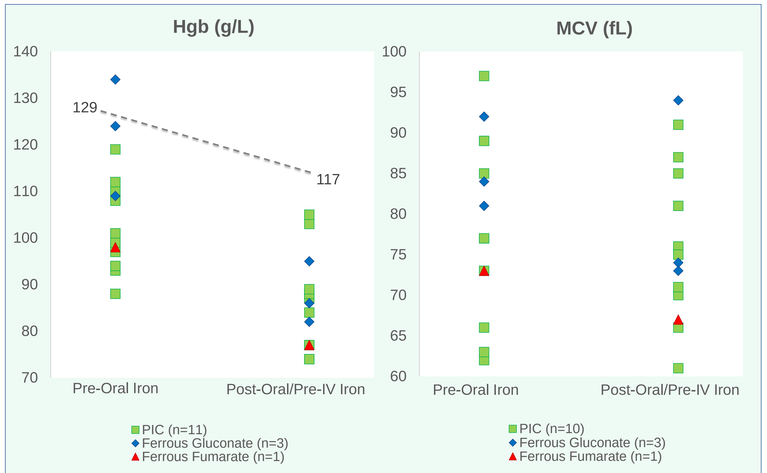

Figure 4 and 5: Hgb and MCV Pre-Oral Iron and Post-Oral/Pre-IV Iron (Difficult to interpret results due to missing data for 13 and 14 patients respectively)
Initial ferritin for all patients were less than 10mcg/L and remained less than 10mcg/L after oral iron Dashed line indicates usual trajectory of Hgb during pregnancy

Type of Iron	Dose (elemental iron mg/day, range)	Duration (days, range)
PIC (n=15)	300 (150-600)	118 (56-231)
Ferrous Gluconate (n=4)	52.5 (35-105)	119 (1-159)
Ferrous Fumarate (n=2)	100	128 (77-179)
Heme Iron (n=2)	22	184 (105-263)
Unknown (n=5)	-	-
Never Received (n=10)	-	-

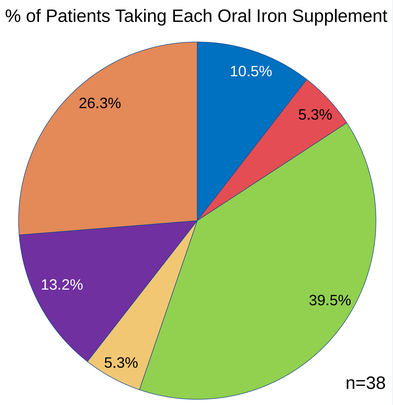

Figure 1: Characterization of Oral Iron Formulations Prior to IV Iron Initiation

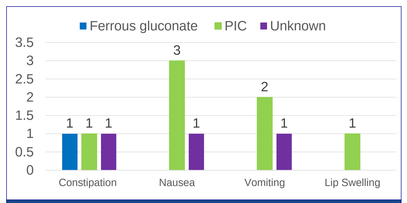

Figure 2: Documented Adverse Reactions from Oral Iron Therapy (n=28)

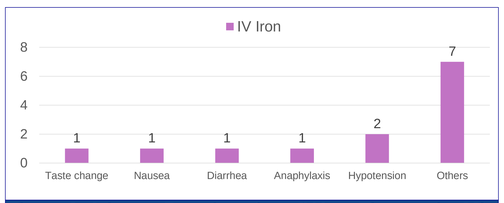

Figure 3: Adverse Reactions from IV Iron Therapy (n=38)
†Others: Headache, swelling and rash, blurred vision, pruritus, burning at injection site, dizziness, palpitations

Limitations

- Small chart review
- Lack of documentation of iron product used, dose and duration of oral iron prior to escalation to IV iron treatment
- Unable to assess for dose titration and adherence
- Inconsistent monitoring and reporting of iron lab parameters
- Underlying medical conditions may affect efficacy of oral iron products
- Poor documentation of severity and occurrence of adverse events and solutions to alleviate symptoms

Conclusions

- PIC was the most common oral iron preparation in pregnant patients requiring IV iron with a median dose of 300 mg elemental iron per day taken for a median of 118 days
- There was no apparent increase in Hgb, MCV or ft for patients on any of the oral iron therapies
- There were 11 adverse events for oral iron and 13 adverse events for IV iron
- The most common reason for escalation to IV iron was “no improvement from oral iron” for all oral iron products
- Further prospective studies evaluating the efficacy and safety of PIC are warranted in the pregnant population