MedNut Mail

The How, When, Where, Which and Why of pharmacotnutrition

Iron supplements and gut microbiota

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https://medicationsandnutrition.online

Commentary

Iron supplements are generally prescribed if serum iron levels are low. Poorly absorbed iron, typically from sources such as iron supplements, results in increased iron availability to the gut microbiota with consequent

- increase in the virulence of faecal enteropathogens,
- increase in the ratio of faecal enteropathogens to protective microbiota such as bifidobacteria and lactobacillus,
- favouring of the colonisation of the gut microenvironment by potentially pathogenic strains,
- increase in gut inflammation.

The growth and colonisation of Lactobacillus and other similar bacteria, is not dependent upon the availability of iron. Lactobacillus and other similar bacteria provide an important barrier effect against colonisation and invasion by pathogens – iron fortification may actually reduce their numbers and consequently weaken the protective effect they confer.

Evidence indicates beneficial gut microbiota have low iron requirements and that enteropathogens thrive once iron is available. Non-haem iron, such as iron from supplements, is poorly absorbed therefore there is an increased supply of iron to the enteropathogens which increases the risk of GI infections. Administration of acid-inhibiting drugs such as the proton pump inhibitors and H-2 antagonists further reduce iron absorption and thus further increases the supply of iron to the enteropathogens.

Iron absorption is significantly improved x 10 if administered attached to protein especially animal proteins, and potentially minimises pathogen harm. Strategies to maximise benefit and minimise harm may include:-

- provision of haem iron - food sources include pate, liver, liverwurst; and/or
- concurrent administration of iron tablet with a probiotic to increase the beneficial bacteria.

If an iron supplement has been prescribed for 3+ months and iron status has not improved then there are 2 questions one must ask -

- why is there no improvement?
- should this intervention continue if it is not being effective?

So, next time you see someone prescribed an iron supplement will you integrate the following into your clinical assessment?

- check their iron parameters, and request them to be checked if they are not available?
- ensure the levels are well within acceptable range?
- if levels are still low and the intervention has been prescribed for 3+ months, then will you ask why it is still low?
- recommend concurrent probiotics for the duration of the iron intervention?
- consider a non-oral iron intervention in order to bypass the gut – especially if an acid-inhibiting medication is prescribed?

Conclusions

Ultimately, low iron status is associated with a range of harms, however in order to address those harms there is an inadvertent risk of causing other harms by altering gut microbiota populations. Introducing strategies to protect the gut microbiota during the iron intervention will both increase benefit and decrease harm associated with iron interventions.

Case study

Medical History with Nutritional Aspect

Amputation	☐	Constipation	☐	Dysphagia	☐	MND	☐
Anaemia	☐	CVA	☐	Enteral Feed	☐	MS	☐
Arthritis	☑	CVD	☐	Falls	☑	Osteoporosis	☑
Cancer	☐	Dementia	☑	Fracture	☐	PD	☐
CCF	☐	Dentures	☐	Frailty	☐	Pressure Area	☐
Chest Infection	☐	Depression	☑	Gout	☐	Renal	☑
COAD	☐	DM Type 1	☐	Hypertension	☑	Ulcer	☐
Confusion	☐	DM Type 2	☑	Incontinent	☑	UTI	☑

Food Allergies:

Other: hyperlipidaemia, hyperthyroidism, CRF

Biochemistry with Pharmaconutritional Consequences

No recent relevant data available

Medications That May Adversely Affect Nutritional Status

Drug	Vits + Mins	bpp >90%	N/V	C/D	Wt	App	Tst	Thir	Sal	Drlg	d m	Dys	BSL
COLOXYL WITH S		☐		D			☐				☐	☐	☐
OSTELIN	(daily)	☐					☐				☐	☐	☐
Paracetamol		☐	NV	CD			☐				☐	☐	☐
Propylthiouracil	A, Fe, Iodine, Li, Se	☐	NV				☑				☐	☐	☑
VENLEXOR XR		☐	NV	CD	↕	↓	☑				☑	☐	☐
		▩					▩				▩	▩	▩

Extra drug:

Comments – medication and nutrition impacts (direct and indirect) only

No recent relevant available biochemistry. Advisable to check plasma proteins (albumin, total proteins) as markers of nutritional status.

BSLs (Jun-Jul)

- daily range - 6.4-9.4; recommended range 4-10

- checked twice-weekly

- reportable limits: < 4 and > 18

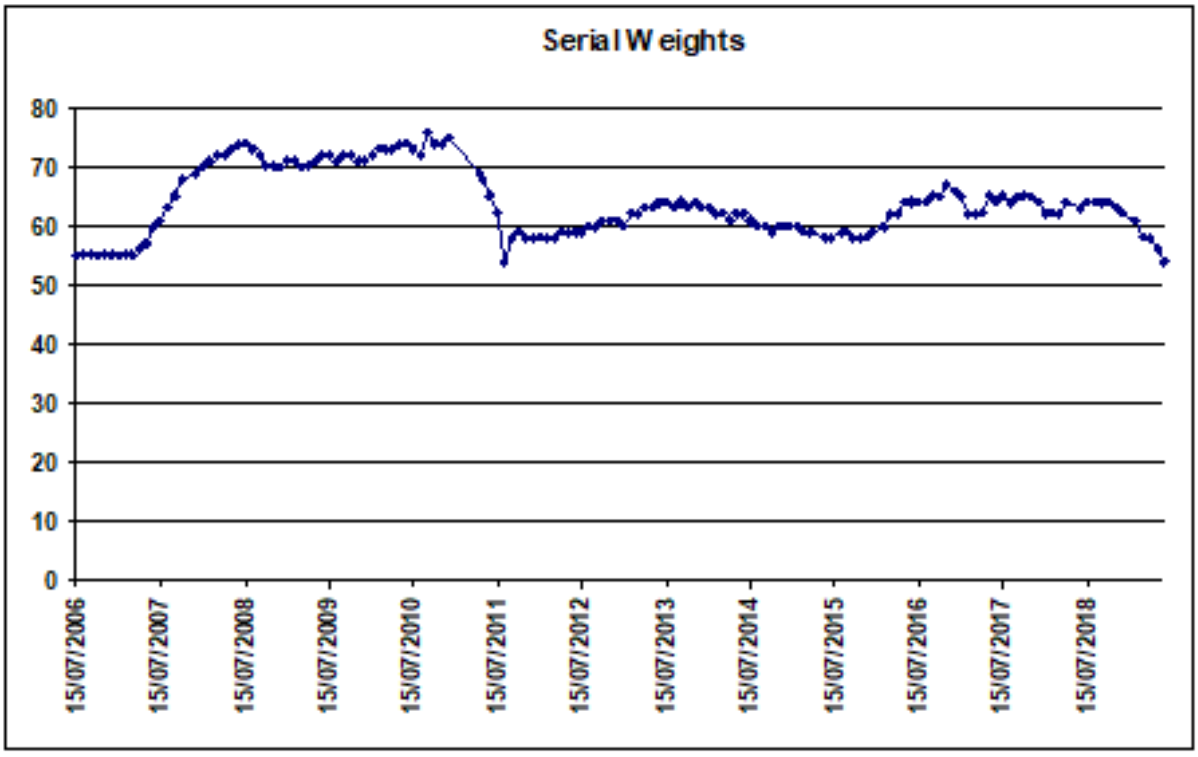
- advisable to check HbA1c and clarify overall glycaemic control.

Chronic use of coloxyl + senna and actilax may promote excessive loss of water and electrolytes, especially potassium, and their regular monitoring recommended.

Dietary levels of caffeine intake in conjunction with paracetamol inhibit antinocieception.

Propylthiouracil decrease iodine uptake by the thyroid.

As can be seen from the weight graph, Mrs AAR remained relatively weight stable about 62-64 kg from early 2016 until late 2018, and since then has lost weight.



Lithium was ceased 6 months ago – lithium associated with increased risk of altered thyroid function.

Staff advise that Mrs AAR has been diagnosed with gallstones and that a surgical intervention is not being considered.

Staff advise Mrs AAR eats well at breakfast and midday, and has a variable food intake in the evenings.

Mrs AAR is a small, pale, frail lady who was sitting in the Day Room participating in an activity - she told us she eats well, and that the food tastes fine.

Since Mrs AAR is pale, advisable to check iron levels and if low then short term (90-120 days) intervention recommended. Concurrent ingestion of paracetamol and iron result increased rate of iron absorption and decreased extent of drug absorption. If an iron intervention is commenced then advisable to administer at a different time from propylthiouracil and paracetamol in order to minimise risk of drug-nutrient interactions.

Mrs AAR‘s diagnoses include hyperthyroidism and given there is significant weight loss, advisable to check thyroid function. One can ask the question is the altered thyroid function due to long term lithium prescription, and since the lithium has been ceased is there a likelihood her thyroid function will improve? Therefore increased monitoring of thyroid function recommended.

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