

New aspects on iron deficiency and its treatment



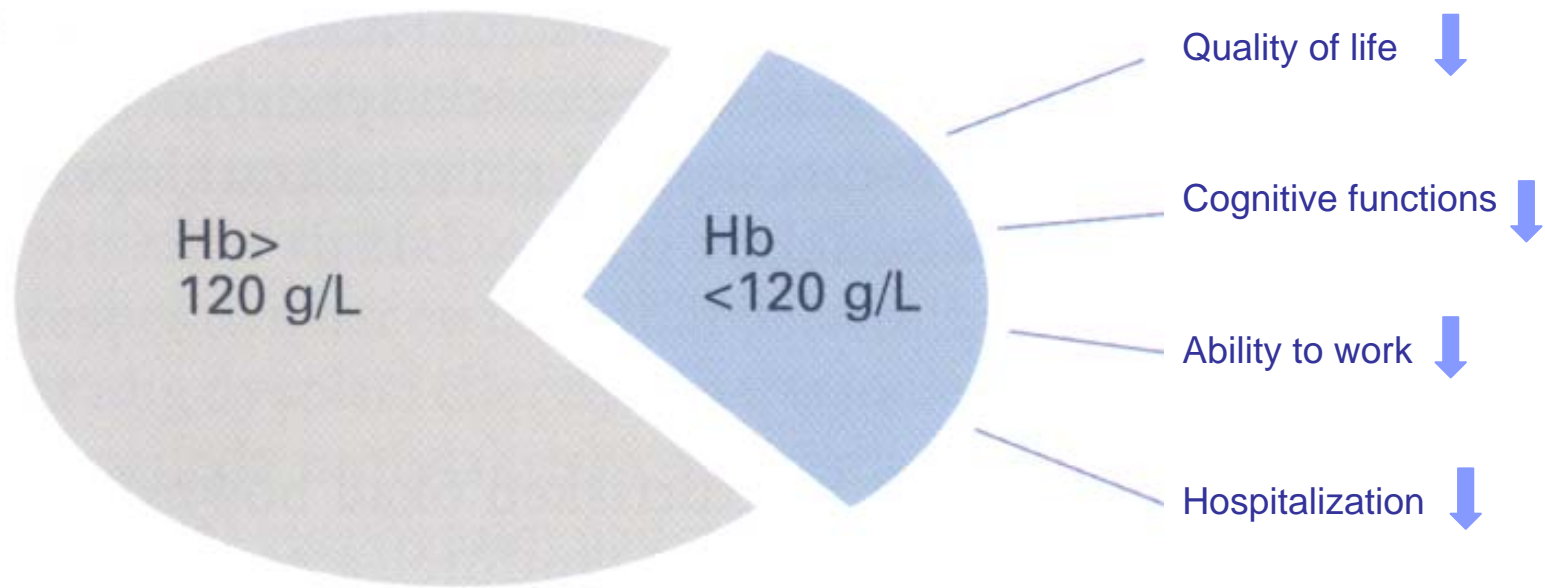
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Malmö, Sweden.

ESIM, Brighton, July 2010

Anemia matters

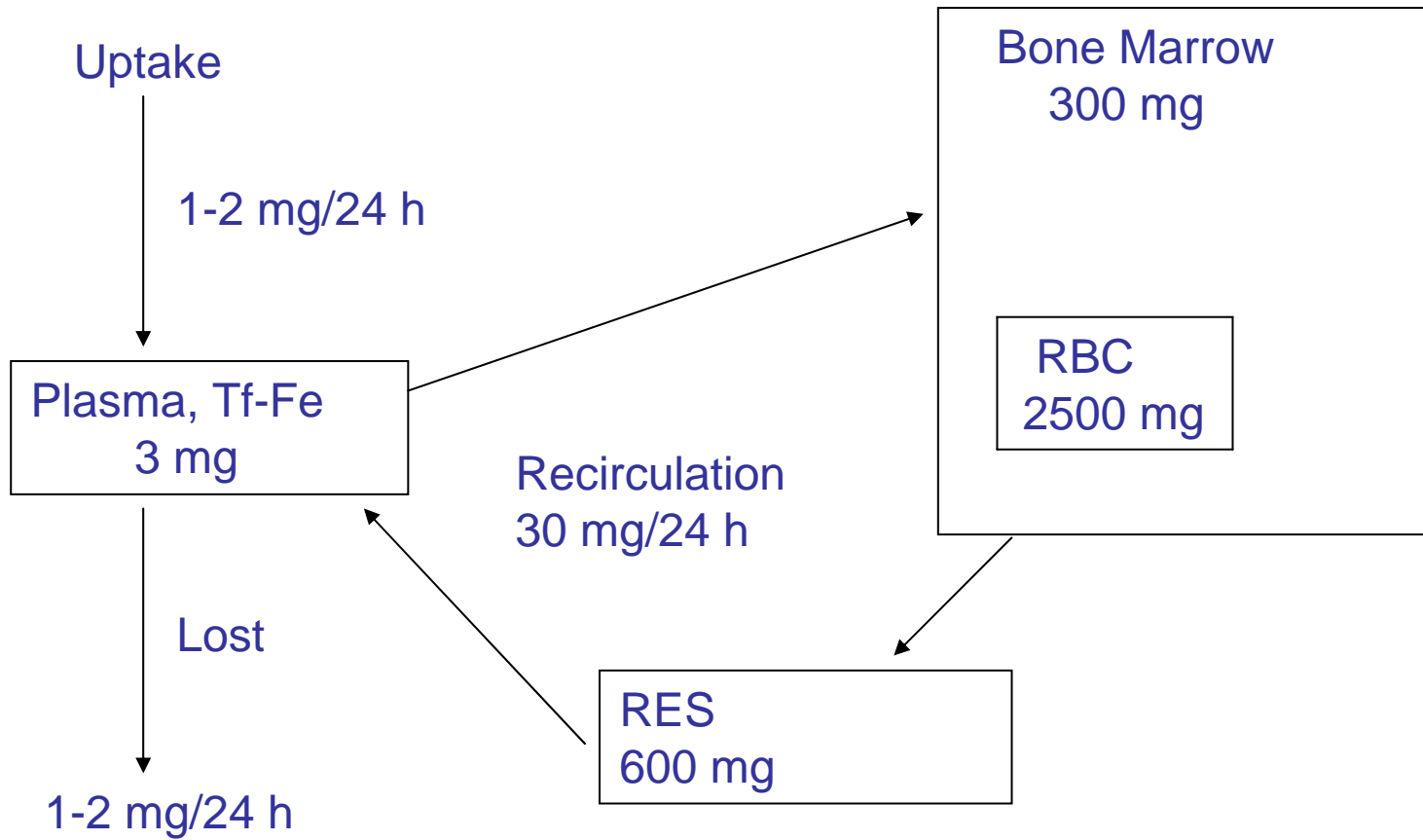
Improved physical and mental
quality of life with normal
hemoglobin concentrations

Anemia is easier to tolerate for
the doctor than for the patient

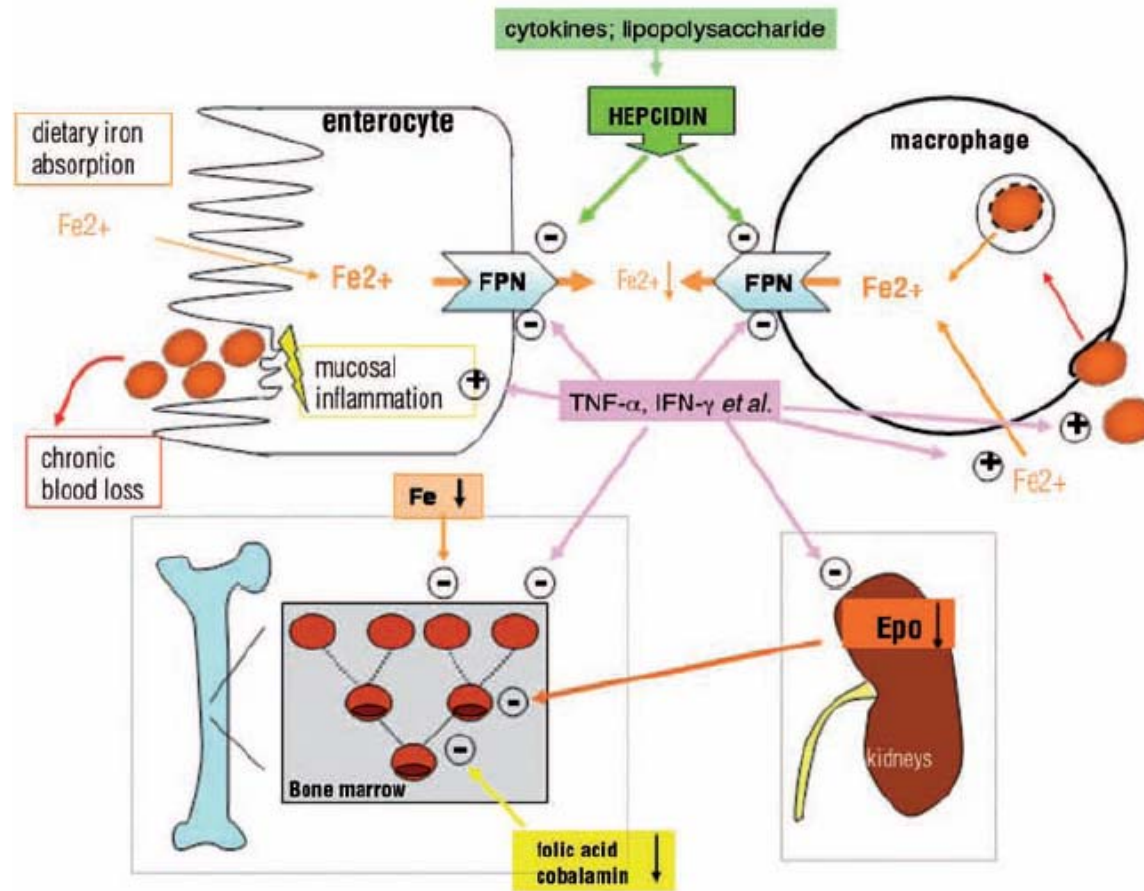


Causes of iron deficiency

- Blood loss
- Decreased absorption
- Increased demand due to increased red blood cell (RBC) production after ESA treatment – Functional Iron Deficiency (FID)
- Chronic inflammation blocking the release of iron from the reticuloendothelial system (RES) – FID



Iron metabolism



Anemia of chronic disease (ACD)

Occurs in patients with Chronic Immune Activation

Underlying causes:

Infections (acute and chronic)

Cancer (hematologic and solid tumors)

Autoimmune diseases (rheumatoid arthritis,
LED, vasculitis, sarcoidosis,
Inflammatory Bowel Disease)

Chronic renal disease and inflammation

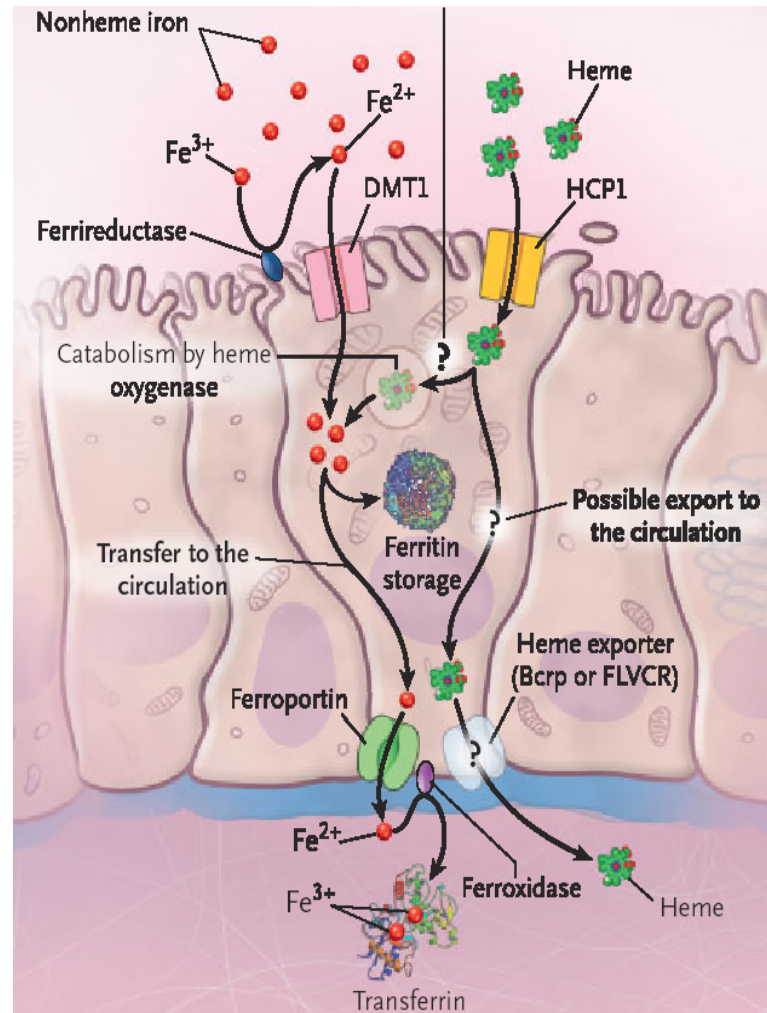
Chronic Heart Failure

Dietary iron

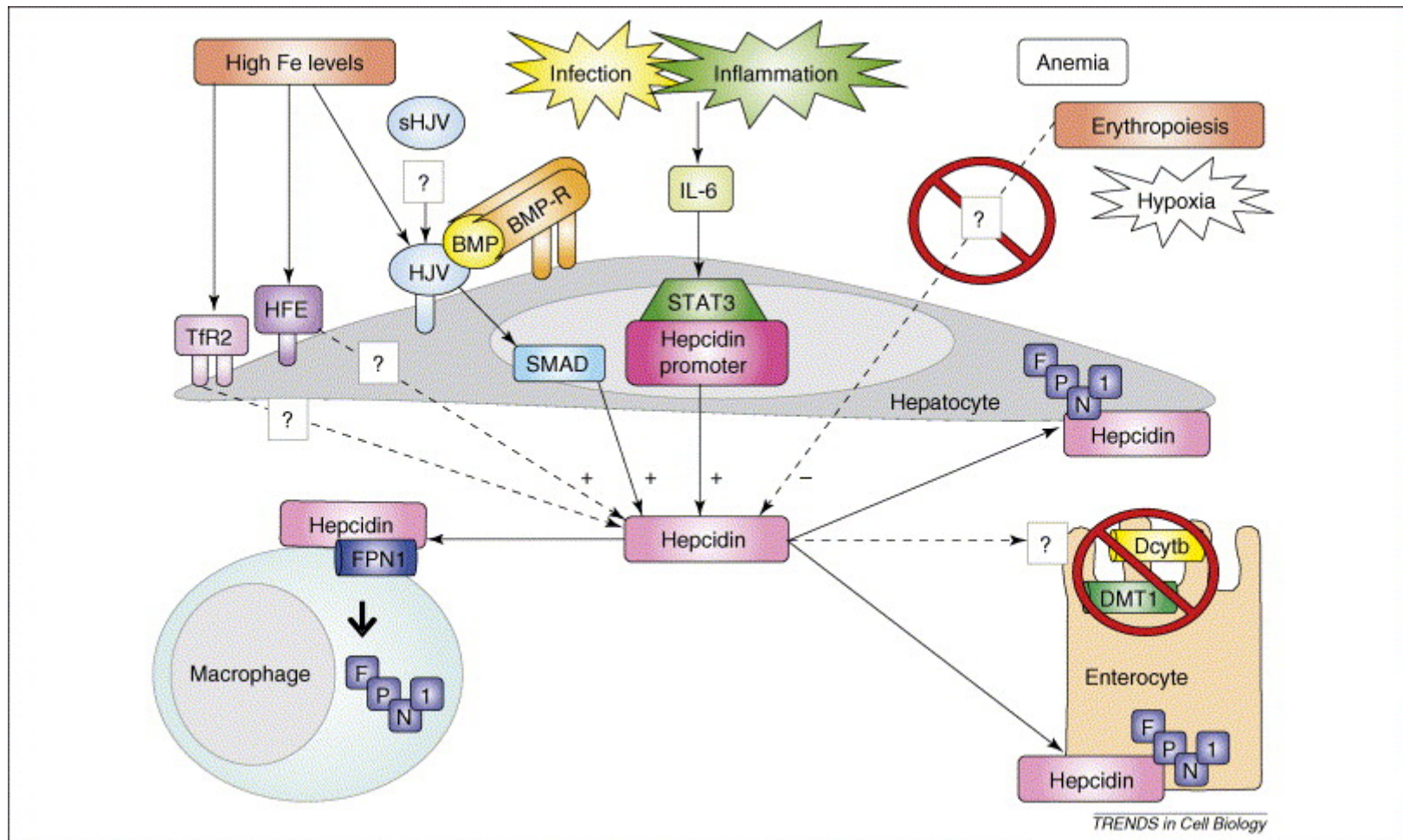
Two forms

- Inorganic iron and haem
 - Haem more bioavailable but poorly soluble at gastric pH
- Inorganic iron
 - Absorption affected by dietary components
 - Tannins
 - Phytic acid
 - Alginates
 - Vitamin C
- Only about 10% dietary iron is absorbed

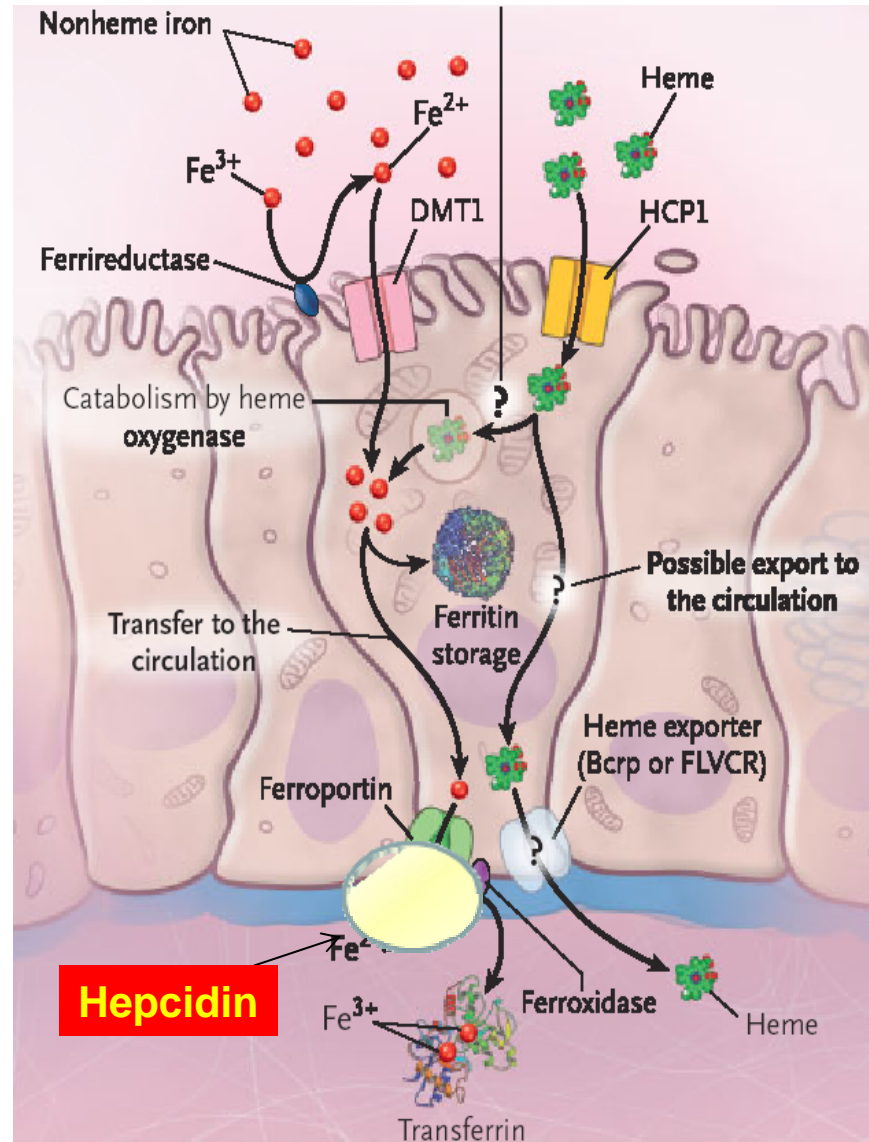
Recent developments in iron metabolism

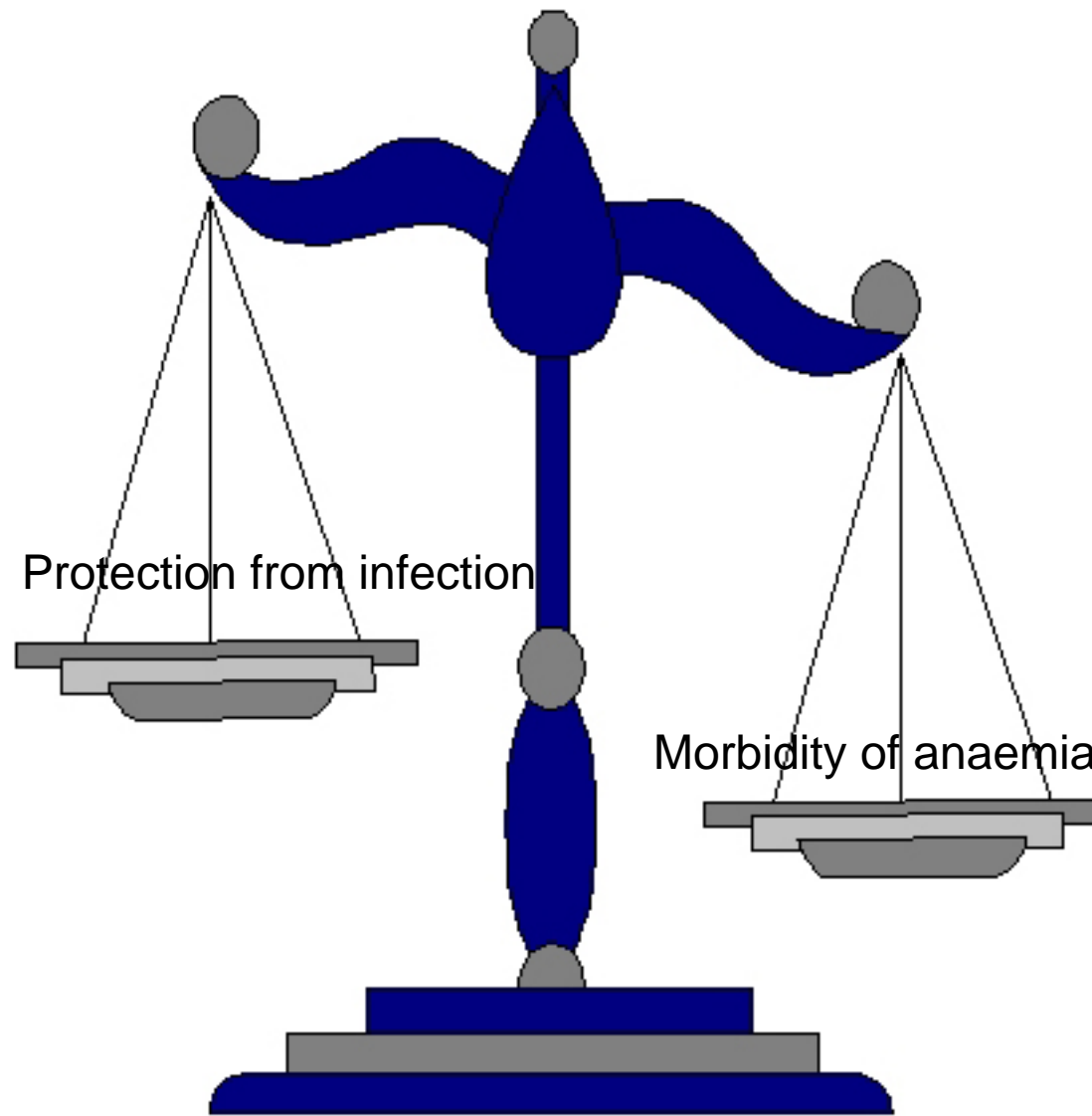


Hepcidin regulation



Hepcidin and iron absorption



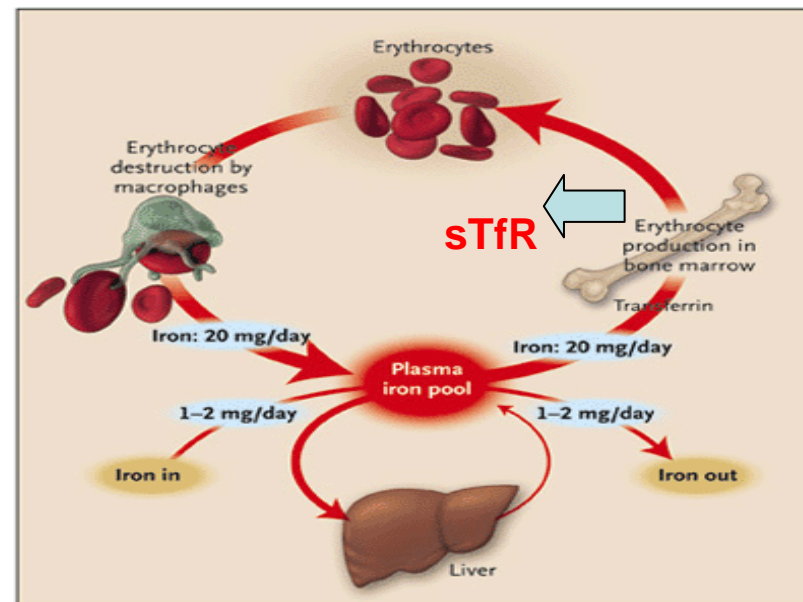


Diagnosis of iron deficiency

	<u>Absolute</u>	<u>ACD</u>	<u>No</u>
Ferritin	<30 µg/L	30-200 µg/L	>200 µg/L
TSAT	<16%	<20%	

IDA diagnosis – sTfR

- Soluble transferrin receptor assay (sTfR)
- % Hypochromic red cells
- Reticulocyte Hb concentration
- sTfR/Ferritin ratio



Anemia matters

Anemia is the most common systemic complication to Inflammatory Bowel Disease (IBD) but often overlooked.

At least one third of IBD patients have iron deficiency and 20% are anemic.
(N=430)

Bager P, Lindgren S et al, in press

Underlying causes of anemia in patients with IBD

Common

Iron deficiency

Anemia of chronic disease

Others

Deficiency of folic acid or vitamin B₁₂

Drugs – thiopurines, sulfasalazine

Hemolysis

Myelodysplastic syndrome

Infliximab

Endoscopical evidence of mucosal healing

Endoscopy before...



May 3rd

...and after 2
infusions of Infliximab



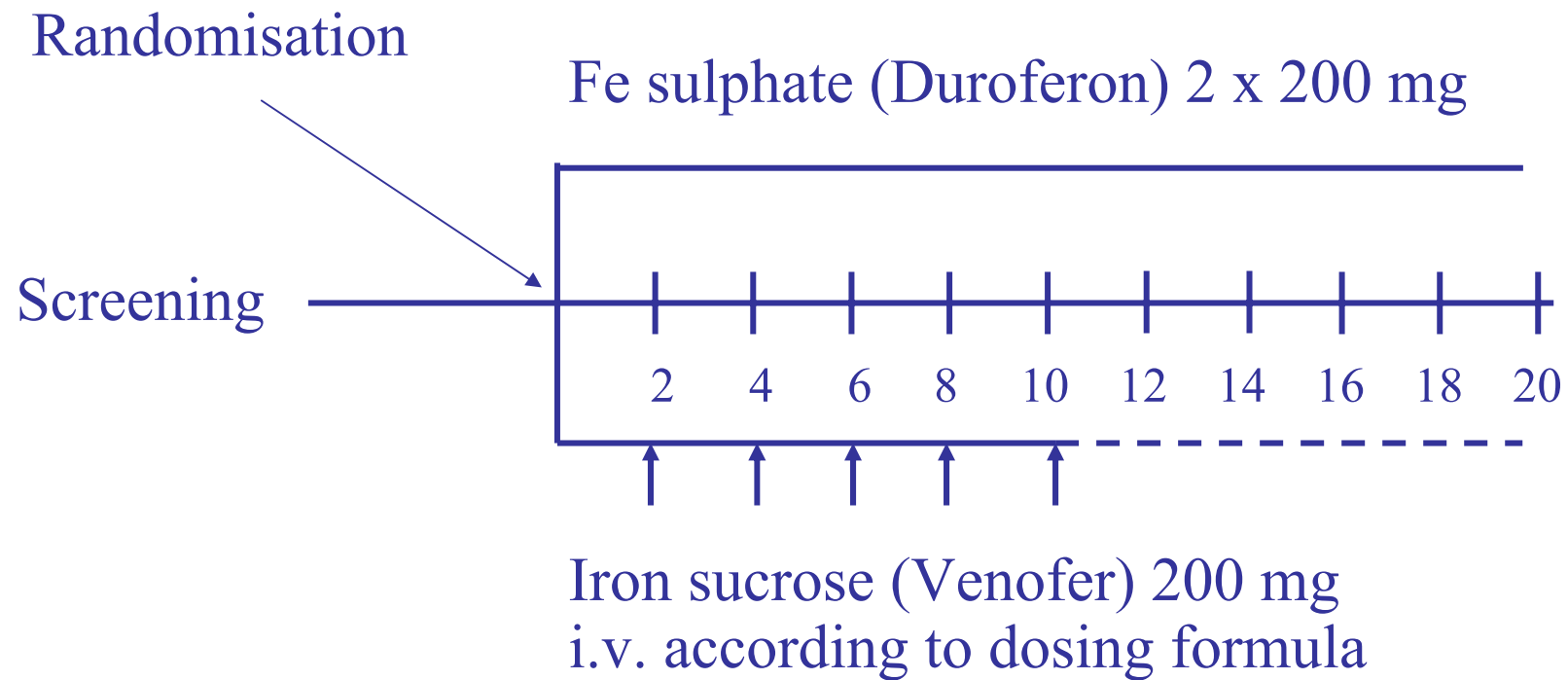
June 21st

Courtesy of P. Rutgeerts, 2002

Background

- Oral iron supplementation is often not tolerated by the patients.
- Unabsorbed oral iron could damage the intestinal mucosa through oxidative stress.

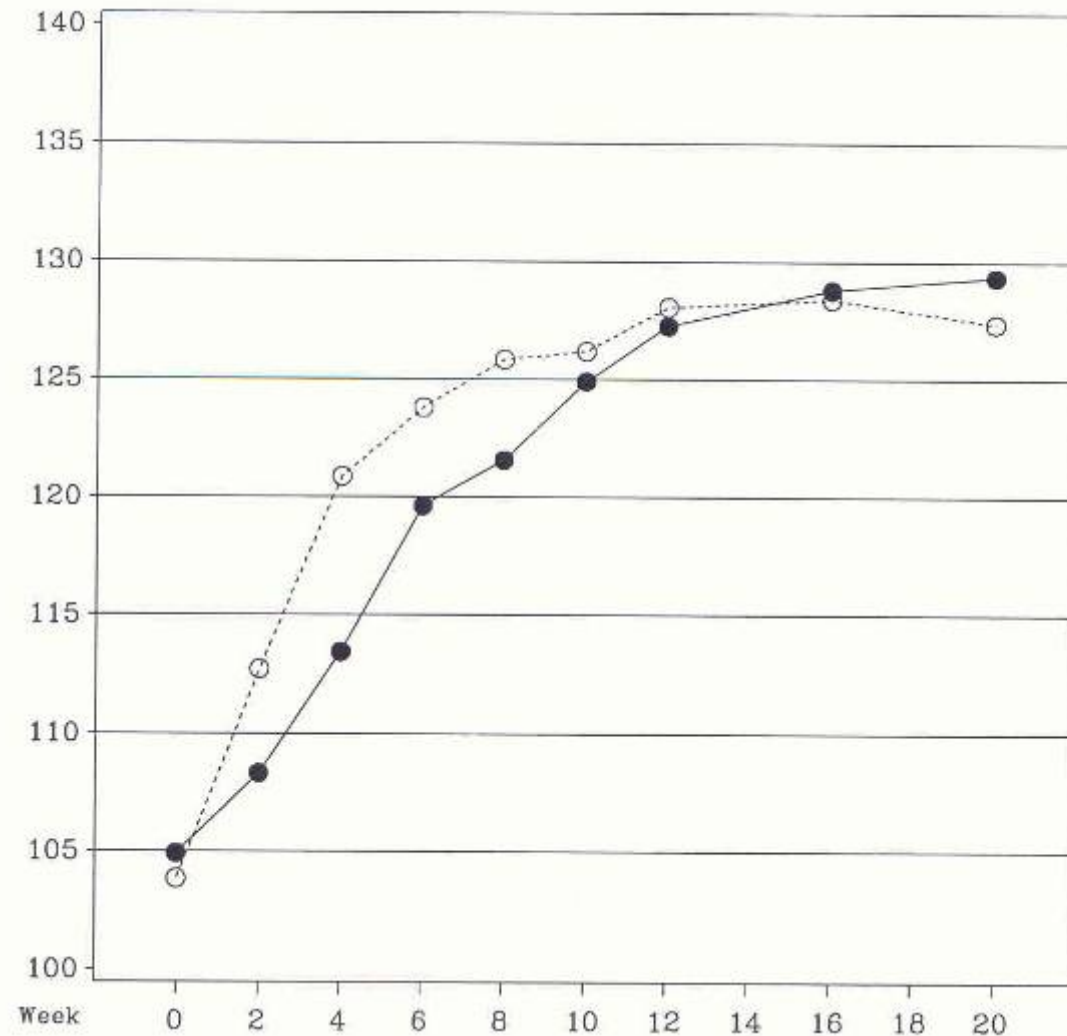
Study design (20 weeks)



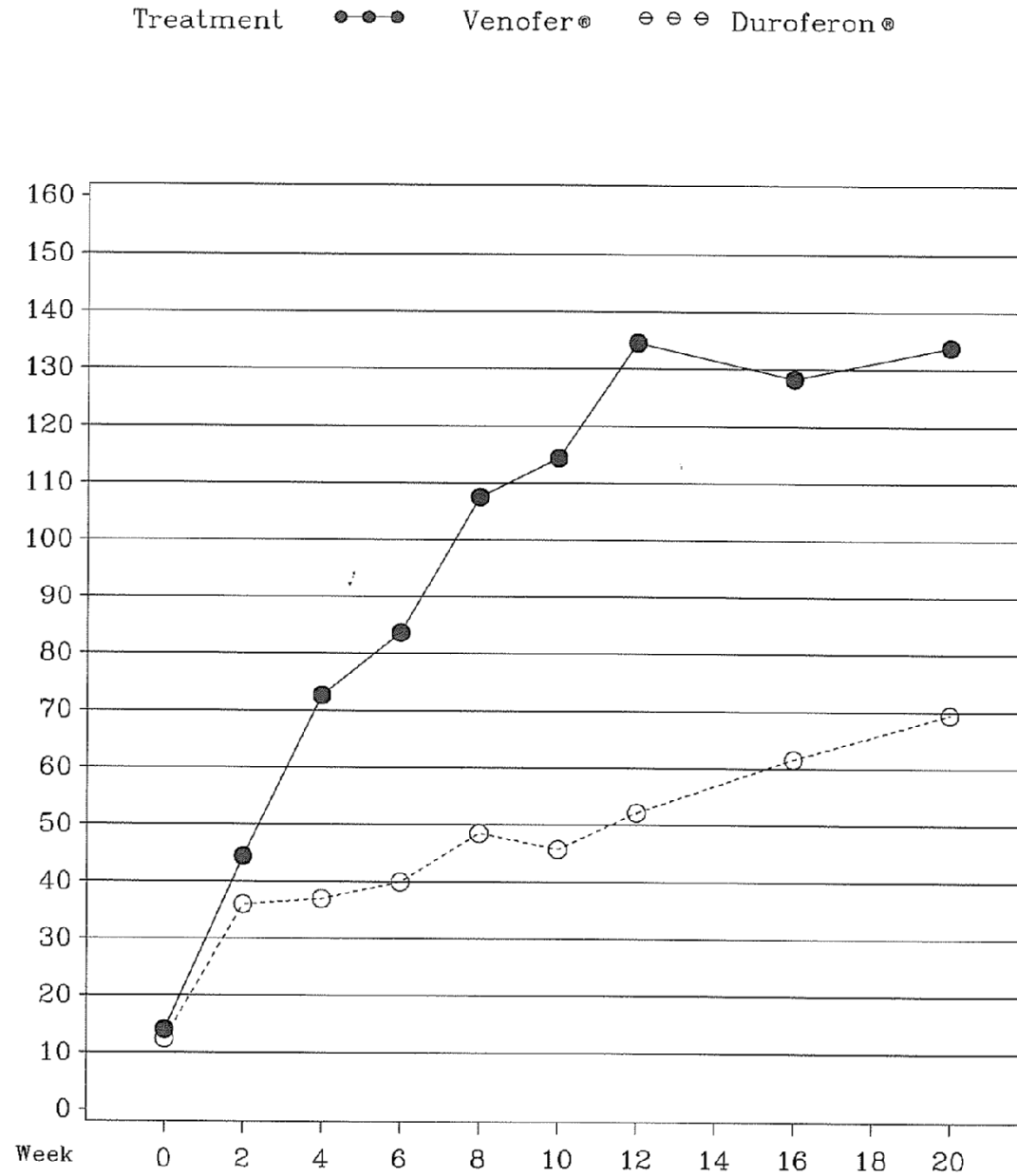
Hb, ITT population (LOCF). All patients

● Fe-sulphate
(Duroferon)

● Fe-sucrose
(Venofer)



Ferritin,
ITT population
(LOCF)
All patients



Guide for treating iron deficiency in IBD

Hb > 120 g/L (women) Hb > 130 g/L (men) Ferritin < 30 µg/L	Hb 100-120 g/L Ferritin < 100 µg/L Transferrin saturation < 16%	Hb < 100 g/L Ferritin < 200 µg/L Transferrin saturation < 20%
Total dose IV iron 1 g	Total dose IV iron 2 g	Total dose IV iron 2-3 g
		If inadequate effect after 4-6 w: Add epoetin 150 E/kg/w

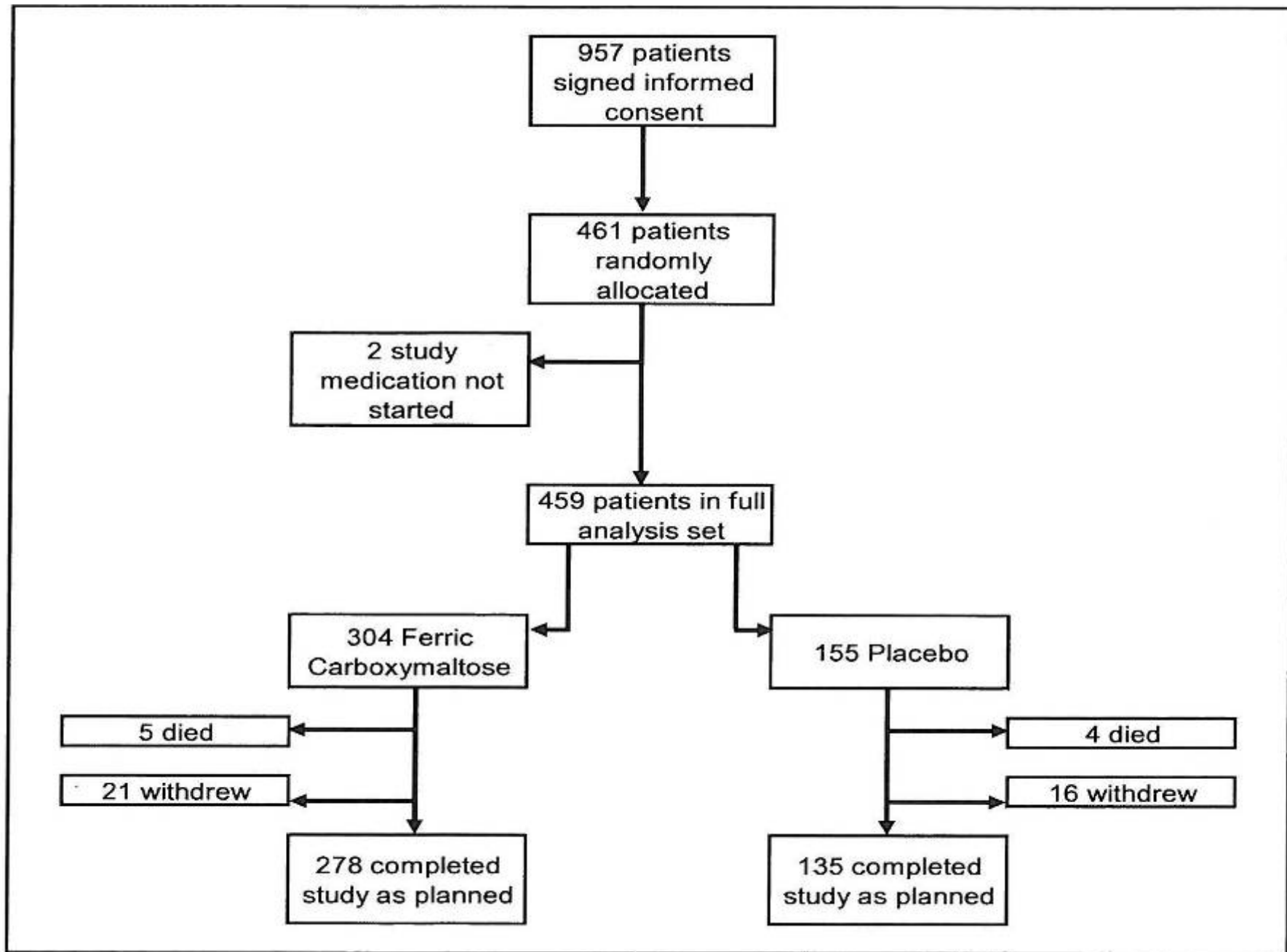
ORIGINAL ARTICLE

Ferric Carboxymaltose in Patients with Heart Failure and Iron Deficiency

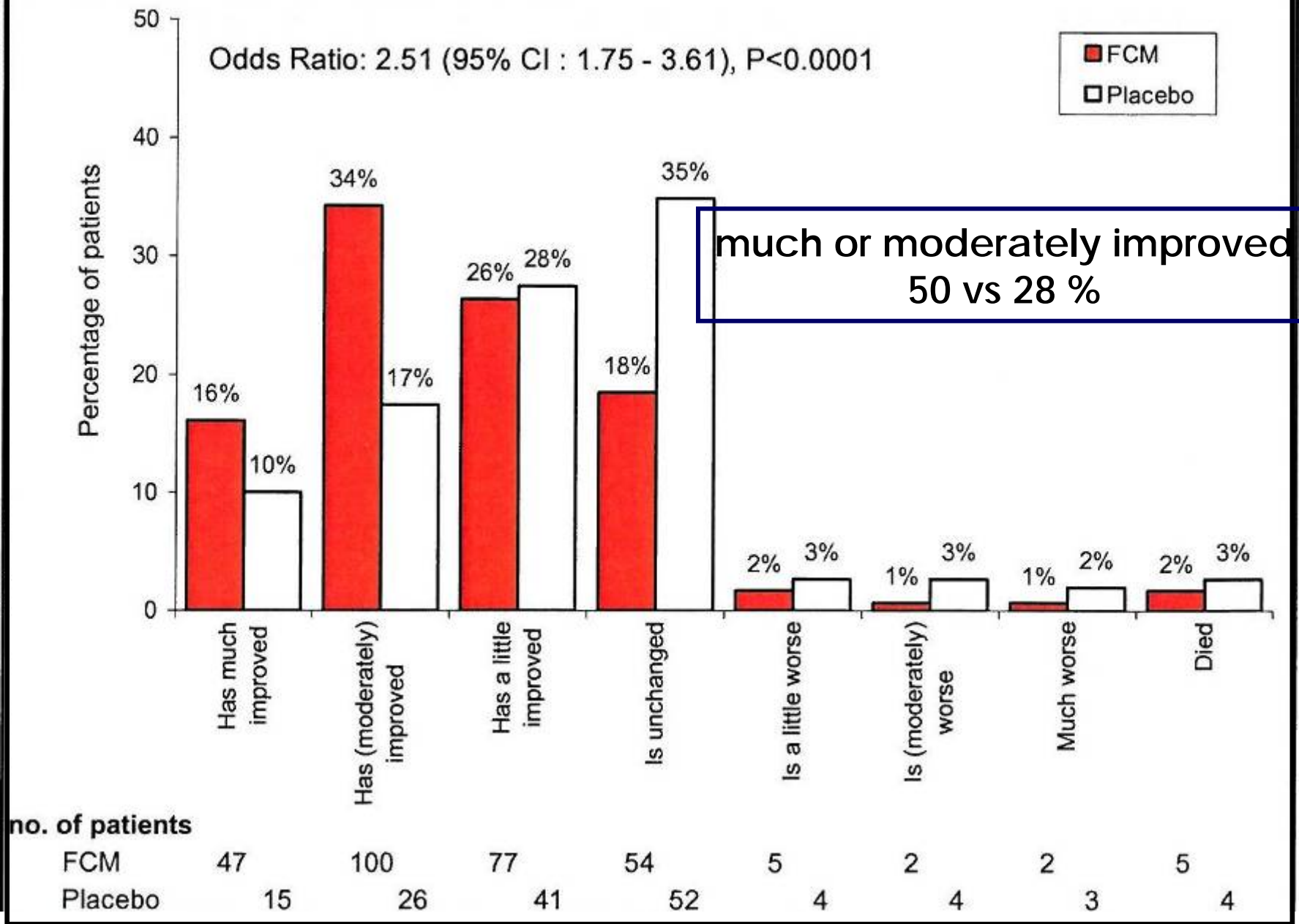
Stefan D. Anker, M.D., Ph.D., Josep Comin Colet, M.D.,
Gerasimos Filippatos, M.D., Ronnie Willenheimer, M.D.,
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Philip A. Poole-Wilson, M.D.,* and Piotr Ponikowski, M.D., Ph.D.,
for the FAIR-HF Trial Investigators†

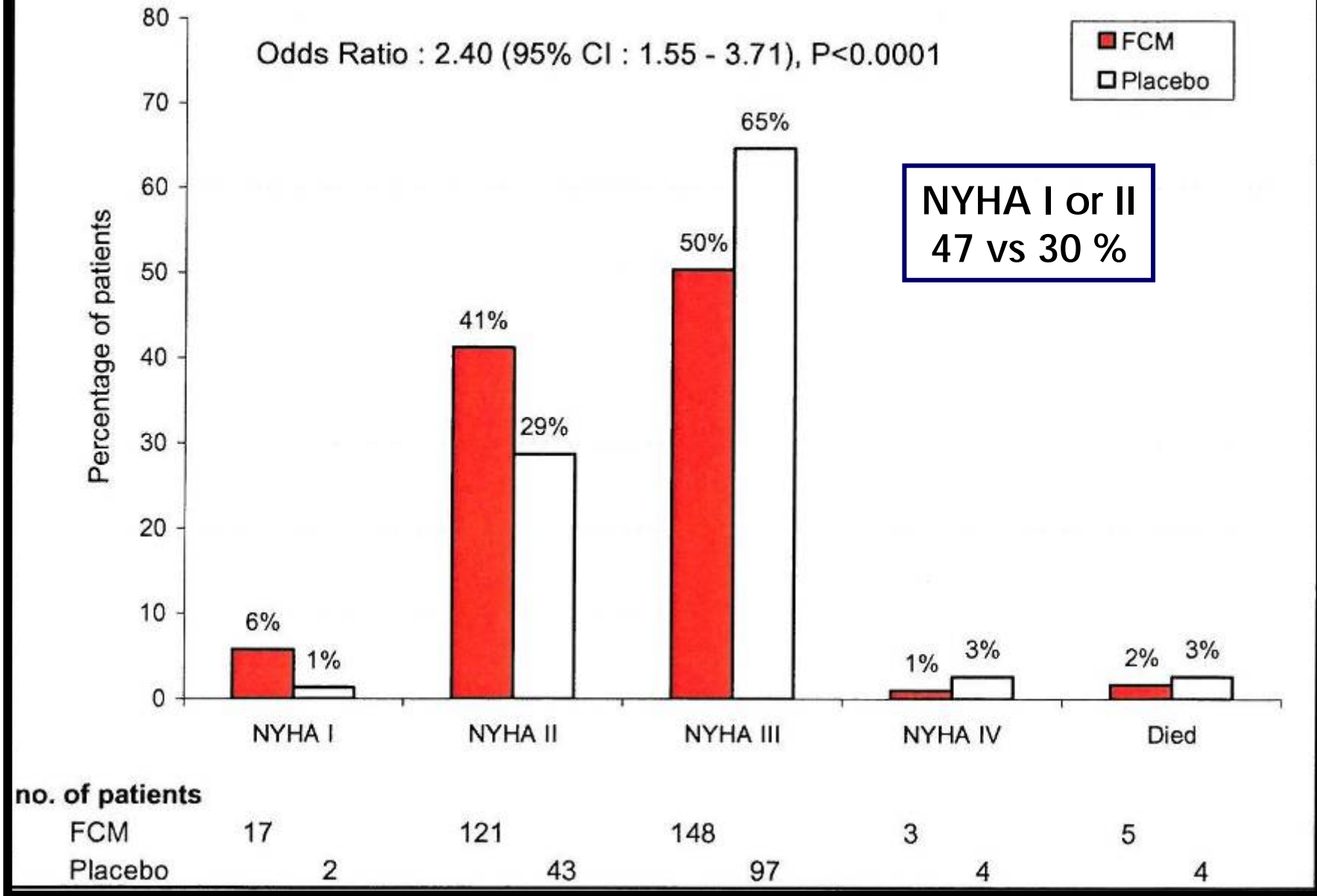
N Engl J Med 2009;36:2436-48.



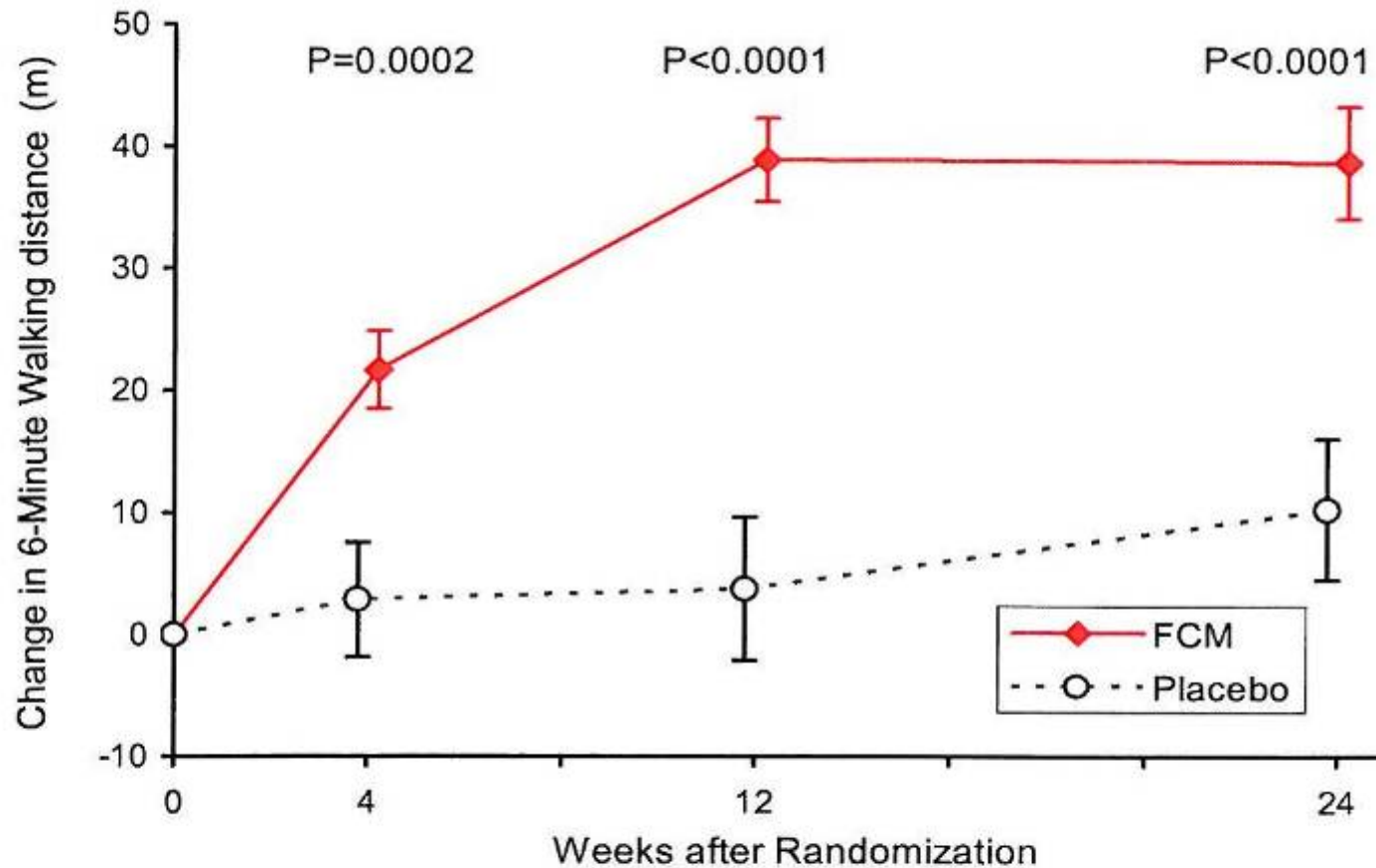
A. Patient Global Assessment at week 24



B. New York Heart Association functional class at week 24



C. Six-minute walk test



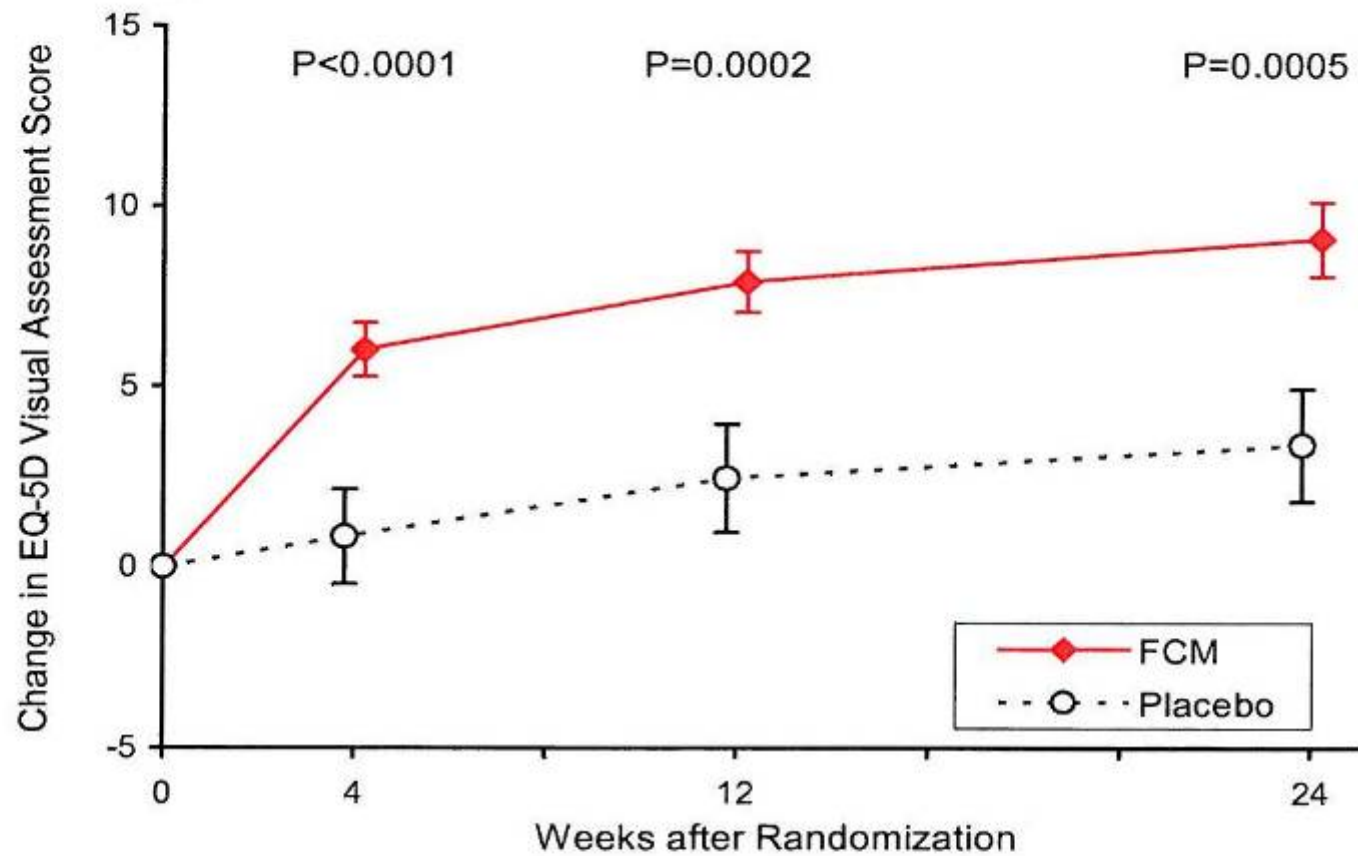
FCM

no. of patients	303	284	280	268
Mean distance	273.8 ± 6.0	293.8 ± 6.7	312.2 ± 6.5	312.9 ± 7.2

Placebo

no. of patients	155	144	141	134
Mean distance	268.8 ± 8.8	268.8 ± 10.0	272.1 ± 10.1	277.4 ± 10.4

D. European Quality of life - 5 dimensions - Visual Assessment Score



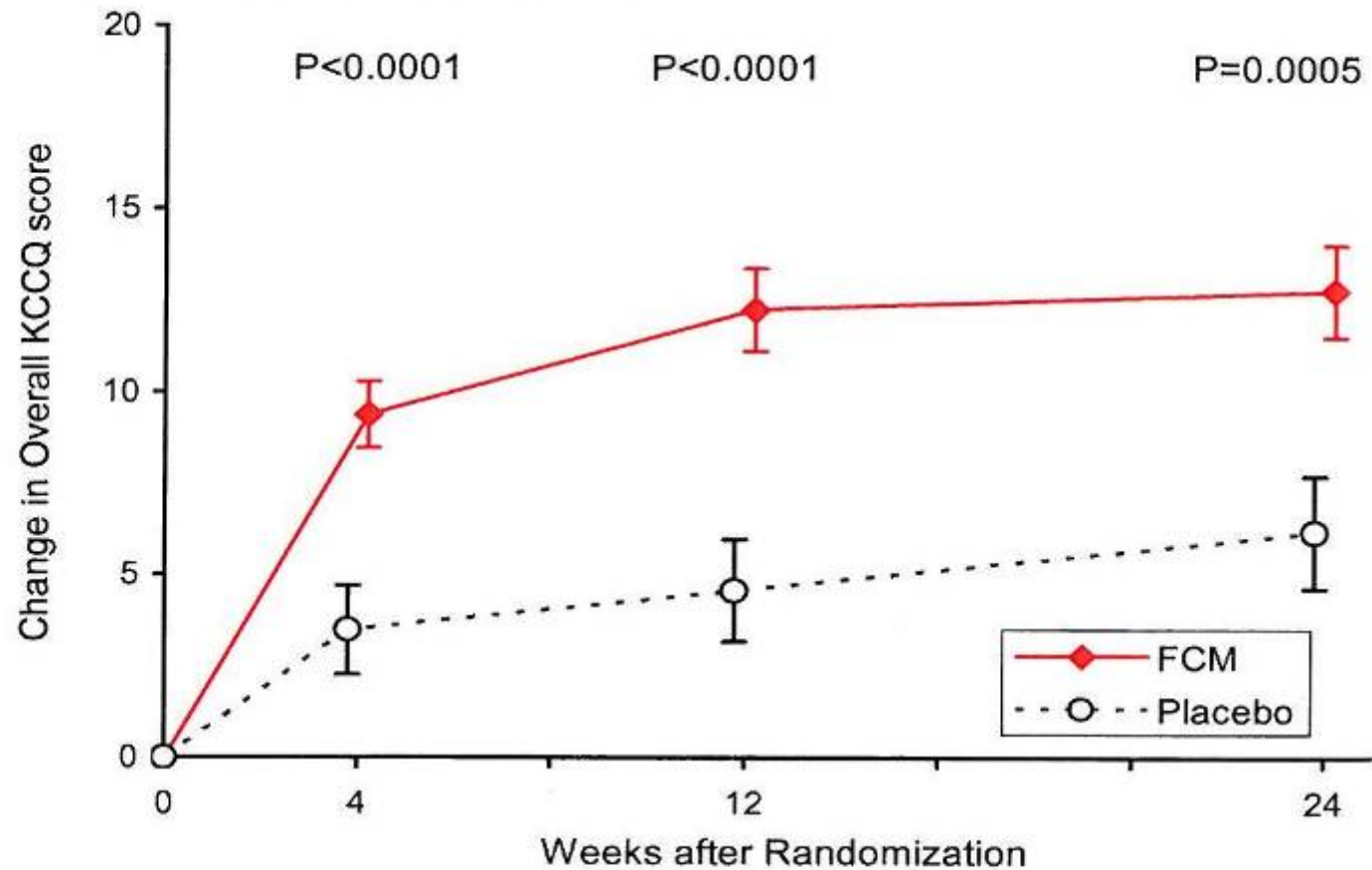
FCM

no. of patients	295	274	283	285
Mean score	54.3 ± 1.0	60.2 ± 1.0	62.2 ± 1.0	63.4 ± 1.1

Placebo

no. of patients	152	140	145	146
Mean score	54.1 ± 1.2	54.3 ± 1.6	56.0 ± 1.7	57.1 ± 1.7

E. Kansas City Cardiomyopathy Questionnaire



FCM

no. of patients	297	277	286	286
Mean score	52.4 ± 1.1	61.8 ± 1.1	65.0 ± 1.2	65.5 ± 1.2

Placebo

no. of patients	151	140	144	145
Mean score	52.5 ± 1.4	56.1 ± 1.7	57.0 ± 1.8	58.6 ± 1.8

Conclusions

I.v. iron

- Highly effective
- Well tolerated
- Restores iron stores rapidly
- IBD patients with anemia usually need at least 2 g iron
- Treatment of choice in IBD

Conclusion

In stable, symptomatic, ambulatory patients with chronic heart failure, an impaired left ventricular ejection fraction, and iron deficiency, treatment with ferric carboxymaltose over a 24-week period improves symptoms, physical performance, and the quality of life and has acceptable side-effect and adverse-event profiles. The benefit was seen in patients with anemia and in those without anemia.

