

# MedNut Mail

The How, What, Which, Where, When and Why of pharmac nutrition



## Chronic alcohol abuse in elder case study

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<https://medicationsandnutrition.com/mednut-mail/>

# PharmacoNutrition data

Mr APD has a complex medical history relating to alcohol abuse.

The report refers to the drug-nutrient, drug-food, and PharmacoNutrition effects only.

## Medical History with Nutritional Aspect

Amputation	<input type="checkbox"/>	Constipation	<input type="checkbox"/>	Dysphagia	<input type="checkbox"/>	MND	<input type="checkbox"/>
Anaemia	<input type="checkbox"/>	CVA	<input type="checkbox"/>	Enteral Feed	<input type="checkbox"/>	MS	<input type="checkbox"/>
Arthritis	<input type="checkbox"/>	CVD	<input type="checkbox"/>	Falls	<input type="checkbox"/>	Osteoporosis	<input checked="" type="checkbox"/>
Cancer	<input type="checkbox"/>	Dementia	<input type="checkbox"/>	Fracture	<input checked="" type="checkbox"/>	PD	<input type="checkbox"/>
CCF	<input type="checkbox"/>	Dentures	<input type="checkbox"/>	Frailty	<input type="checkbox"/>	Pressure Area	<input type="checkbox"/>
Chest Infection	<input type="checkbox"/>	Depression	<input checked="" type="checkbox"/>	Gout	<input type="checkbox"/>	Renal	<input type="checkbox"/>
COAD	<input type="checkbox"/>	DM Type 1	<input type="checkbox"/>	Hypertension	<input type="checkbox"/>	Ulcer	<input type="checkbox"/>
Confusion	<input type="checkbox"/>	DM Type 2	<input type="checkbox"/>	Incontinent	<input type="checkbox"/>	UTI	<input type="checkbox"/>
Food Allergies	<input type="text" value="seizures with ETOH withdrawal"/>						
Other:	<input type="text" value="ETOH abuse, pancreatitis, ABI"/>						

## Biochemistry with PharmacoNutrition Consequences

Na:	<input type="text" value="140"/>	mmol/l	Hb:	<input type="text" value="151"/>	g/L	Albumin:	<input type="text" value="47"/>	g/L	BSL:	<input type="text"/>	mmol/l
K:	<input type="text" value="4.7"/>	mmol/l	Lymph:	<input type="text" value="1.6"/>		Total Protein:	<input type="text" value="80"/>	g/L	HbA1C:	<input type="text"/>	
Urea:	<input type="text" value="2.7"/>	mmol/l	MCV:	<input type="text" value="88"/>	mmol/l	B12:	<input type="text" value="291"/>	<input type="text" value="pmol/L"/>	INR:	<input type="text"/>	
Creatinine:	<input type="text" value="0.075"/>	mmol/l	Zn:	<input type="text"/>	umol/l	Folate:	<input type="text" value="2755"/>	<input type="text" value="nmol/L"/>	TSH:	<input type="text" value="2.08"/>	mIU/L
Other:	<input type="text" value="RP &lt; 1, ESR 5, vit D 45, Ca 2.43, Ca corr 2.37, phos 1.01, Mg 0.84, chol 5.6, Tg 2.1, HDL 0.94, LDL 3.7, LDL:HDL 3.9,"/>										

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### Prescribed medications side effects - biochemistry

Prescribed medicines and their impacts on biochemistry												
Drug	Y=yes		↑↓									
	BPP	ana	Alb	BSLs	Na	K	Ca	Mg	Zn	Cr	pho	UA
Acamprosate	0											
Alendronate	78						↓				↓	
Atenolol				↑↓								
Calcitriol	99.9						↑				↑	
Esomeprazole	97				↓	↓	↓	↓	↓			
Fluoxetine	95			↑↓	↓							
Naltrexone	20-21											
Olanzapine	93											
Paracetamol	10-25	Y	↓	↑		↓					↓	
Psyllium						↓						

BPP – binding to plasma proteins ≥ 90%, ana – anaemia, alb – albumin, glyc – glycaemia, Na – sodium, K – potassium, Ca – calcium, Mg – magnesium, Zn – zinc, Cr – chromium, pho – phosphates, UA – uric acid

### Prescribed medications side effects profile

Prescribed medicines and some of their side effects												
Drug	N/V	C/D	<u>Wt</u>	App	AT	DM	<u>Thir</u>	Dys	SW	Tre		
Acamprosate	N/V	C/D			Y			Y				
Alendronate			↑									
Atenolol	N/V	C/D				Y						
Calcitriol	N	C/D										
Esomeprazole	N/V	C/D	↑		Y	Y			Y			
Fluoxetine	N/V	C/D	↑↓	↓	Y	Y		Y	Y	Y		
Naltrexone	N/V	C/D	↑↓	↑↓		Y	Y		Y	Y		
Olanzapine		C	↑	↑		Y						
Paracetamol	N/V	C/D										
Psyllium												

N – nausea, V – vomiting, C – constipation, D – diarrhoea, Wt – weight, App – appetite, AT – altered taste, DM – dry mouth, Thir – thirst, Dys – dysphagia, SW – sweating, Tre - tremor

### Prescribed medications affected nutrients profile

Prescribed medicines and some of the nutrients that interact with them														
Drug	Nutrients affected (Y = yes)													
	B12	B9	B1	B2	B6	VC	VD	Cr	K	Mg	Zn	Ca	Fe	Na
Acamprosate												Y		
Alendronate														
Atenolol				Y										
Calcitriol														
Esomeprazole	Y		Y							Y	Y	Y	Y	
Fluoxetine														Y
Naltrexone														
Olanzapine								Y						
Paracetamol													Y	
Psyllium														

B12 – cobalamin, B9 – folate, B1 – thiamine, B6 -pyridoxine, VC – vitamin c, VD – vitamin D, VK – vitamin K, K – potassium, Mg – magnesium, Zn – zinc, Ca – calcium, Na – sodium, Cr - chromium

### Transporter-mediated interactions and nutrients matrix

Transporter	OCT1		OCT2		OCT3		OAT1		MATE1		MATE2		OATP1A2	
Nutrients - Sub	B1, choline		B1, choline		B1, choline, carnitine		B2, B5, pyridoxic acid (B6), B7, B9		B1, B2, carnitine		B1, B2		Retinoids	
Nutrients - Inh														
DRUG	Sub	Inh	Sub	Inh	Sub	Inh	Sub	Inh	Sub	Inh	Sub	Inh	Sub	Inh
Acamprosate														
Alendronate														
Atenolol	Y		Y						Y		Y		Y	
Calcitriol														
Esomeprazole		Y												
Fluoxetine	Y	Y		Y										
Naltrexone														
Olanzapine		Y												
Paracetamol								Y						
Psyllium														

Sub – substrate, Inh – inhibitor, B1 – thiamine, B2 – riboflavin, B3 – niacin, B5 – pantothenic acid, B6 – pyridoxine, B7 – biotin, B9 – folic acid, B12 – cobalamin, NMN – N-methylnicotinamide, TYR - tryptophan

## Albumin-mediated interactions and nutrients matrix

Albumin's binding sites for currently prescribed medicines and nutrients affected					
Binding site	Site I	Site II	Site III	ATCUN/NTS	Cys-34
Nutrients - Substrates	B1, B2, B3, B9, Vit C	Vit E	B12, Vit A	Co, Cu, Ni	
Acamprosate					
Alendronate	Y				
Atenolol					
Calcitriol					
Esomeprazole	Y				
Fluoxetine	Y				
Naltrexone					
Olanzapine	Y				
Paracetamol					
B1 – thiamine, B2 – riboflavin, B3 – niacin, B9 – folic acid, B12 – cobalamin, Co – <u>cobalt</u> , Cu – copper, Ni - nickel					

## Biochemistry

Recent relevant biochemistry indicates no apparent direct impacts on nutrient levels

## Glycaemia

Currently prescribed 3 medications that alter glycaemia.

## PharmacoNutrition

Alendronate requires adequate intake of calcium and vitamin D to be effective.

Calcitriol is prescribed and a calcium intervention is not prescribed.

Administration of alendronate with coffee or orange juice reduces availability of drug by ~ 60%.

Regular monitoring of calcium levels recommended during calcitriol stabilisation.

Esomeprazole decreases B12, vitamin C, magnesium, zinc, iron and thiamine levels and may decrease calcium absorption.

Regular monitoring sodium levels recommended whilst fluoxetine prescribed.

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Early evidence indicates olanzapine both decreases chromium accumulation and increases chromium excretion.

Concurrent ingestion of paracetamol and iron increases rate of iron absorption and decreases extent of paracetamol absorption. Consequently, the authors advise paracetamol and iron be administered at different times from each other.

### **Distribution**

#### **Membrane transporters**

Some of the identified transporters alter the absorption and/or organ and cellular uptake of a range of nutrients. Inhibition of transporters means blood test results may be unreliable. To clarify nutrient status advisable to conduct blood tests at least one hour before administration of relevant prescribed medicines. A concurrent detailed Diet History is also essential to corroborate adequacy of intake of all affected nutrients. Further, all affected nutrients to be monitored on a regular basis ie at least annually.

Substrate nutrients affected by Mr ADP's prescribed medications include - thiamine, riboflavin, pantothenate, pyridoxine, biotin, folate, choline, carnitine, retinoids.

#### **Albumin**

Nutrients likely to be directly displaced by Mr ADP's albumin-carrying prescribed medications include - B1, B2, B3, B9, Vit C.

#### **Bowel management**

Regular intervention prescribed.

Oral PRN aperients prescribed.

No Nurse Initiated interventions administered.

#### **Staff comments**

Staff advise Mr APD is now eating well.

#### **Observations**

Mr APD is a well-built man who was dozing on his bed when I went to speak to him. He stirred to his name and told me he eats well, the food tastes fine, and that he sometimes feels upset in the tummy. He looks much better than last time I saw him - and agreed he feels much better.

Mr APD is currently weight stable.

## PharmacoNutrition comments

### **Glycaemia**

Mr APD is currently prescribed 3 medications that alter glycaemia. If his glycaemic status destabilizes then advisable to question and address drug impact before initiating diabetes-management interventions.

### **PPI prescription**

Mr APD has been prescribed a proton pump inhibitor for 5 years. The evidence is increasing that long-term (3+ years) proton pump inhibitor prescription is associated with -

- increased risk of food sensitivities at a level of peanut allergy, due to partial protein digestion;
- increased risk of coeliac disease due to partial protein digestion;
- altered gut microbiome;
- increased risk of scurvy;
- generalised malnutrition due to impaired absorption of nutrients such as B12, vitamin C, magnesium, zinc, iron, etc;
- altered gastric pH which reduces absorption dynamics of a range of drugs and nutrients. Altered drug availability is relatively easily identified whilst altered nutrient availability is rarely identified due to the non-specific nature of their signs and symptoms.

Consequently, advisable to review current proton pump inhibitor prescription and consider whether -

- a proton pump inhibitor prescription is still required;
- suppression of gastric acidity is still required.

## Bone health

Mr APD's diagnoses include fractures ie impaired bone health. Nutritional factors to consider monitoring include -

**Cobalamin (B12)** – is important in osteoblast activity, and bone strength. Currently prescribed esomeprazole therefore advisable to monitor status on a regular basis;

**Vitamin C** – is important in collagen formation, osteoblast synthesis, osteoclast suppression, reducing oxidative stress, regenerating vitamin E. Increasing intake is associated with increased bone density. Currently prescribed esomeprazole therefore advisable to monitor status on a regular basis;

**Calcium** – is important in skeletal development and growth, and bone mineralization. Currently prescribed acamprosate and esomeprazole therefore advisable to monitor intake and status on a regular basis;

**Magnesium** – is important in bone formation and mineralization, calcium homeostasis, osteoclastic and osteoblastic activity, and skeletal fragility. Currently prescribed esomeprazole therefore advisable to monitor status on a regular basis;

**Zinc** – is important as a cofactor for many metalloproteins involved in bone development. Currently prescribed esomeprazole therefore advisable to monitor status on a regular basis.

## Alcohol impacts

Mr APD's diagnoses include alcohol abuse. Nutrients compromised by excessive alcohol intake include thiamine and magnesium. Further esomeprazole decreases availability of both thiamine and magnesium. Adequate availability of magnesium is essential for activation of thiamine, therefore advisable to monitor magnesium status. Advisable to clarify thiamine status and if low or marginal then intervention recommended. Intervention to be administered at a time that is not compromised by either esomeprazole impact or impaired distribution system.

What else would you include?

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### Please read this as it is important ...

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