

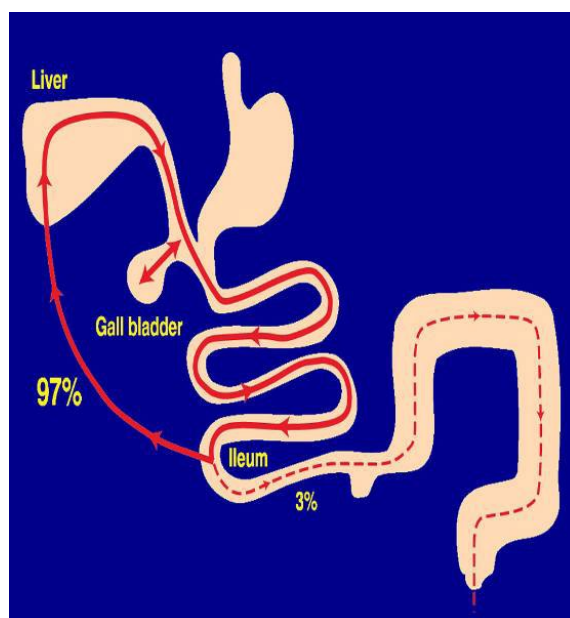
Patient Information

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Bile Acid Malabsorption (BAM)

What is BAM?

Bile acids are essential for the digestion of fats and fat-soluble vitamins. They are produced by enzymes in the liver and stored in the gallbladder. Eating a meal causes contraction of the gallbladder, which releases bile acids into the upper part of the small bowel to emulsify dietary fats. Once the bile acids reach the distal part of the small bowel (ileum), they are mostly (97%) reabsorbed into the bloodstream and travel back to the liver where they are ready to be used for the next meal.



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Figure demonstrating the production of bile acids in the liver, storage in gallbladder, release into the small bowel and reabsorption from the ileum into the bloodstream and back to the liver.

How does BAM develop?

Excess bile acids enter the large bowel (colon) if the ileum has been removed by surgery, there is damage by inflammation, or there is a deficiency of the hormone Fibroblast Growth Factor 19 (FGF-19) that is produced by the body. FGF-19 normally switches off bile acid production when bile acids are reabsorbed and therefore in patients with a deficiency in this hormone, more bile acids are

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produced than can be absorbed. Diarrhoea occurs from an excess of bile acids entering the colon, causing excess water to be secreted into the bowel.

What does this mean for me?

An estimated 5-8% of the population are affected by BAM. It can be debilitating and impact considerably on daily activities due to urgency to go to the toilet, increased bowel frequency and the fear of incontinence.

Vitamin B12 is an essential nutrient, which is absorbed by the ileum into the body, therefore patients with BAM who have problems with their ileum, may become deficient in this vitamin. Symptoms may include extreme tiredness, shortness of breath, memory impairment and depression. It is therefore recommended a vitamin B12 level is checked on an annual basis.

If BAM is untreated, there is an increased risk of kidney stones and gallstones developing.

What is the treatment for BAM?

Encouragingly, there is good and effective treatment available. Medicines should be taken for at least 10 days before determining they do not work as they can take several days to show an improvement in diarrhoea. Treatment will be required for life and it is unlikely that symptoms will improve without treatment.

Dietary Advice

Referral to an experienced dietician may be considered to discuss the use of a very low fat diet. A diet containing less than 40g fat/day may be advised. Specialist dietetic advice is essential if you are underweight and need a very low fat diet.

Medication

The mainstay of treatment is bile acid sequestrants (BAS). The three commercially available BAS are Colestyramine (Questran), Colestipol (Colestid) and Colsevelam (Cholestagel). BAS are non-digestible and bind to the bile acids to prevent the secretory effects of bile acids on the colon, hence improving diarrhoea. The most commonly used BAS are Colestyramine and Colestipol - in powder or granule formulation and dissolved in water to make a paste.

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Colsevelam is the more recent BAS, which is a tablet but is currently unlicensed for BAM and is more expensive than the conventional BAS. It has been reported that when Colestyramine is tolerated, it is successful in 70% of patients who maintain a good clinical response at follow up. 30% of patients report treatment failure, mainly secondary to ineffectiveness and unpalatability. There is no association between treatment success and severity of BAM.

Side Effects

Colestyramine and Colestipol: Constipation, nausea, abdominal pain, stomach rumbling and flatulence. They are often considered unpalatable hence resulting in poor tolerability and compliance with treatment.

Colsevelam: Can potentially cause the same side effects as the other BAS but has improved tolerability.

Patients are advised to take their other medications either 1 hour before or 4-6 hours after BAS administration. This is because:

1. BAS are capable of binding other compounds therefore they decrease the intestinal absorption of fat soluble vitamins and many other medications including digoxin, warfarin and diuretics.
2. It is recommended patients on BAS should have their bloods tested every 12 months to look at the levels of vitamins A,D E and K (fat soluble vitamins). If the levels are low, then treatment with vitamin supplements can be started.
3. Although BAS are good for cholesterol, they can occasionally increase the level of a different type of fat (triglycerides) which is harmful at very high levels. Therefore, it is advised triglyceride levels are checked on an annual basis if BAS are to be taken long-term.