

Impaired Gallbladder Function - Part Three

Here is a case. We saw this patient in the liver presentation, a 26-year-old female with a chief complaint of GI issues, anxiety and panic attacks, hair loss, fatigue, lethargy, hypotension, acne, dry skin, and eczema. These issues began after travel in Thailand four years prior.

Marker	Value	Functional Range	Lab Range
Glucose	75	75 – 85	65 - 99
Hemoglobin A1c	5.1	4.4 – 5.4	4.8 - 5.6
Uric Acid	4.2	3.2 - 5.5	2.5 - 7.1
BUN	21	13 – 18	6 - 20
Creatinine	1.10	0.85 – 1.1	0.57 - 1
Sodium	140	135 – 140	134 - 144
Potassium	4.4	4.0 – 4.5	3.5 - 5.2
Chloride	101	100 – 106	97 - 108
C02	22	25 – 30	18 - 29
Calcium	9.4	9.2 – 10.1	8.7 - 10.2
Phosphorus	4.5	3.5 – 4.0	2.5 - 4.5
Magnesium	2.0	2.0 – 2.5	1.6 - 2.6
Protein, total	6.7	6.9 – 7.4	6.0 - 8.5
Albumin	4.6	4.0 – 5.0	3.5 - 5.5
Globulin	2.1	2.4 – 2.8	1.5 - 4.5
A/G ratio	2.2	1.5 – 2.0	1.1 - 2.5
Bilirubin, total	0.5	0.1 – 1.2	0.0 - 1.2
Alkaline Phosphatase	41	42 – 107	39 - 117
LDH	425	140 - 180	119 - 226
AST	98	10 - 30	0 - 40
ALT	36	10 - 22	0 - 32
GGT	9	10 - 26	0 - 60
TIBC	316	250 – 350	250 - 450
UIBC	167	150 - 375	150 - 375
Iron	149	85 – 135	35 - 155
Iron saturation	47	15 – 40	15 - 55
Ferritin	40	10 - 122	15 - 150
Cholesterol, total	195	150 – 250	100 - 189
Triglycerides	82	50 – 100	0 - 114
HDL	67	55 – 85	> 39
LDL	112	0 – 175	0 - 119
Triglycerides / HDL Ratio	1.22	< 2	< 3.8
TSH	1.950	0.5 – 2.5	0.45 - 4.50
T4, total	5.3	6.0 – 12	4.5 - 12
T3 Uptake	26	28 - 35	24 - 39
T3, Total	91	100 – 180	71 - 180

Her ALT, AST, LDH, BUN, and creatinine are all lab-high, and her alkaline phosphatase and GGT were low-normal. Since alkaline phosphatase, GGT, and bilirubin are all normal, gallbladder issue is an unlikely cause of elevated LDH here. AST and ALT are high, however, as is creatinine and BUN, so could this be a kidney issue? It is unclear, and testing is still ongoing in this patient.

Marker	Value	Functional Range	Lab Range
Glucose	83	75 – 85	65 - 99
Hemoglobin A1c	5.6	4.4 – 5.4	4.8 - 5.6
Uric Acid	3.4	3.2 - 5.5	2.5 - 7.1
BUN	19	13 – 18	6 - 24
Creatinine	0.58	0.85 – 1.1	0.57 - 1
Sodium	140	135 – 140	134 - 144
Potassium	3.9	4.0 – 4.5	3.5 - 5.2
Chloride	100	100 – 106	97 - 108
CO2	25	25 – 30	18 - 29
Calcium	9.0	9.2 – 10.1	8.7 - 10.2
Phosphorus	4.5	3.5 – 4.0	2.5 - 4.5
Magnesium	1.9	2.0 – 2.5	1.6 - 2.6
Protein, total	6.4	6.9 – 7.4	6.0 - 8.5
Albumin	4.4	4.0 – 5.0	3.5 - 5.5
Globulin	2.0	2.4 – 2.8	1.5 - 4.5
A/G ratio	2.2	1.5 – 2.0	1.1 - 2.5
Bilirubin, total	0.2	0.1 – 1.2	0.0 - 1.2
Alkaline Phosphatase	87	42 – 107	39 - 117
LDH	251	140 - 180	119 - 226
AST	31	10 - 30	0 - 40
ALT	41	10 - 22	0 - 32
GGT	13	10 - 26	0 - 60
TIBC	307	250 – 350	250 - 450
UIBC	213	150 - 375	150 - 375
Iron	94	85 – 135	35 - 155
Iron saturation	31	15 – 40	15 - 55
Ferritin	86	MW: 33 - 263	15 - 150
Cholesterol, total	185	150 – 250	100 - 199
Triglycerides	47	50 – 100	0 - 149
HDL	95	55 – 85	> 39
LDL	81	0 – 175	0 - 99
Triglycerides / HDL Ratio	0.49	< 2	< 3.8
TSH	0.036	0.5 – 2.5	0.45 - 4.50
T4, total	7.4	6.0 – 12	4.5 - 12
T3 Uptake	31	28 - 35	24 - 39
T3, Total	70	100 – 180	71 - 180

The next patient is a 60-year-old female with chief complaint of bloating, food intolerances, allergies, and mouth sores. ALT and LDH are lab-high. AST is functionally high. Alkaline phosphatase, GGT, and bilirubin are normal.

TESTS	RESULT	FLAG	UNITS	REFERENCE INTERVAL
HFP7				
Protein, Total, Serum	6.1		g/dL	6.0 - 8.5
Albumin, Serum	4.2		g/dL	3.5 - 5.5
Globulin, Total	1.9		g/dL	1.5 - 4.5
A/G Ratio	2.2			1.1 - 2.5
Bilirubin, Total	0.3		mg/dL	0.0 - 1.2
Bilirubin, Direct	0.09		mg/dL	0.00 - 0.40
Bilirubin, Indirect	0.21		mg/dL	0.10 - 0.80
Alkaline Phosphatase, S	72		IU/L	39 - 117
AST (SGOT)	22		IU/L	0 - 40
ALT (SGPT)	26		IU/L	0 - 32
LD Isoenzymes				
LDH	197		IU/L	119 - 226
LD Isoenzymes:				
(LD) Fraction 1	29		%	17 - 32
(LD) Fraction 2	31		%	25 - 40
(LD) Fraction 3	23		%	17 - 27
(LD) Fraction 4	9		%	5 - 13
(LD) Fraction 5	8		%	4 - 20

Given the elevations of ALT and AST, I ran a full hepatic panel as well as LDH isoenzymes, and all were normal, so in this case, you might just observe and retest in maybe six months.

Indications for **high GGT**

Confirm liver/gallbladder origin of ↑ alk phos

Alcohol abuse or alcoholic liver disease

Metabolic dysfunction

Cardiovascular disease

Iron overload

The last marker is GGT. Remember from the liver presentation that it is not sensitive or specific enough on its own to use for liver disease, and the same is true for gallbladder disease, but it can be helpful in the context of other markers. As I mentioned on the alkaline phosphatase slide, GGT can be used to confirm a liver or gallbladder origin of elevated alkaline phosphatase. Isolated elevation of GGT or elevation of GGT out of proportion to other markers can be a sign of alcohol abuse or alcoholic liver disease, and also recall that elevated GGT can occur in the settings of metabolic disease such as diabetes or insulin resistance, cardiovascular disease, and iron overload.

Marker	Value	Functional Range	Lab Range
Glucose	95	75 - 85	65 - 99
Hemoglobin Alc	5.4	4.4 - 5.4	4.8 - 5.6
Uric Acid	7.8	W: 3.2 - 5.5	2.5 - 7.1
BUN	14	13 - 18	6 - 24
Creatinine	0.83	0.85 - 1.1	0.57 - 1.00
Sodium	141	135 - 140	134 - 144
Potassium	4.6	4.0 - 4.5	3.5 - 5.2
Chloride	105	100 - 106	97 - 108
CO2	20	25 - 30	18 - 29
Calcium	10.4	9.2 - 10.1	8.7 - 10.2
Phosphorus	2.5	3.5 - 4.0	2.5 - 4.5
Magnesium	2.0	2.0 - 2.5	1.6 - 2.6
Protein, total	6.8	6.9 - 7.4	6.0 - 8.5
Albumin	4.2	4.0 - 5.0	3.5 - 5.5
Globulin	2.6	2.4 - 2.8	1.5 - 4.5
A/G ratio	1.6	1.5 - 2.0	1.1 - 2.5
Bilirubin, total	0.6	0.1 - 1.2	0.0 - 1.2
Alkaline Phosphatase	61	42 - 107	39 - 117
LDH	145	140 - 180	0 - 214
AST	33	10 - 26	0 - 40
ALT	55	10 - 26	0 - 32
GGT	44	10 - 26	0 - 60
TIBC	326	250 - 350	250 - 450
UIBC	226	150 - 375	150 - 375
Iron	100	85 - 135	35 - 155
Iron saturation	31	15 - 40	15 - 55
Ferritin	73	W: 10-122	15 - 150
Cholesterol, total	261	150 - 250	100 - 199
Triglycerides	233	50 - 100	0 - 149
HDL	62	55 - 85	> 39
LDL	152	0 - 175	0 - 99
Triglycerides / HDL Ratio	3.758	< 2	< 3.8
TSH	3.060	0.5 - 2.5	0.450 - 4.50
T4, total	5.8	6.0 - 12	4.5 - 12.0
T3 Uptake	35	W: 28-35	24 - 39
T3, Total	120	100 - 180	71 - 180
Vitamin D, 25-hydroxy	16.1	35 - 60	30.0 - 100.0
WBC	7.4	5.0 - 8.0	3.4 - 10.8
RBC	4.35	4.4 - 4.9	3.77 - 5.28
Hemoglobin	13.2	W: 13.5-14.5	11.1 - 15.9

	Value	Functional Range	Lab Range
Hematocrit	40.7	W: 37-44	34.0 - 46.6
MCV	94	85 - 92	79 - 97
MCH	30.3	27.7 - 32.0	26.6 - 33.0
MCHC	32.4	32 - 35	31.5 - 35.7
RDW	13.0	11.5 - 15.0	12.3 - 15.4
Platelets	310	150 - 415	150 - 379
Neutrophils	59	40 - 60	40 - 74
Lymphocytes	32	25 - 40	14 - 46
Monocytes	6	4.0 - 7.0	4 - 12
Eosinophils	2	0.0 - 3.0	0 - 5
Basophils	1	0.0 - 3.0	0 - 3
B-12	974	450 - 2000	211 - 946
Additional Tests:			
C- Reactive Protein	5.06		0.00 - 3.00
Homocysteine	6.8		0.00 - 15.0
Sed Rate (Westergren)	24		0 - 32

Here is another case. We again saw it in the liver unit. A 64-year-old female with weight loss as her sole concern. Her GGT is not lab-high, but it is well out of the functional range at 44. ALT is lab-high. AST is functionally high. LDH is normal, and in this case, alkaline phosphatase is completely normal and not correlating with GGT.

Note that she has several markers of metabolic dysfunction such as high uric acid, high triglycerides, high CRP, low vitamin D, and several metabolic markers out of the functional range, including poor thyroid function. This is almost certainly nonalcoholic fatty liver disease leading to an elevation of GGT, so in this case, the elevated GGT is metabolic, not related to gallbladder dysfunction.

Treatment/prevention of gallbladder dysfunction

Weight loss

Increase physical activity

Paleo (*gluten-free*) diet

Discontinue drugs that harm gallbladder

Address underlying conditions

Let's talk briefly about treatment of gallbladder dysfunction. I don't have a lot of experience treating gallbladder disease outside of gallstones. I haven't seen it much in practice. Remember, the modifiable causes of gallbladder dysfunction are obesity; lack of physical activity; diet, including gluten; drugs; and underlying conditions such as IBD. If gallbladder dysfunction is mild and uncomplicated, addressing these factors can lead to resolution. As I mentioned earlier, I've had patients facing cholecystectomy who were able to avoid surgery simply by switching from a Western diet with gluten to a Paleo-type diet.

If the patient has a more complicated presentation and markers for gallbladder cancer such as elevations in LDH, particularly isoenzymes 3 and 4, you should obviously refer out.

Supplements and botanicals for gallbladder dysfunction

Intervention	Comments
Bitters	Help with bile synthesis and metabolism
Other botanicals	Help with bile synthesis and metabolism
Phosphatidylcholine	Prevents and possibly dissolves gallstones
Vitamin C	Prevents gallstones
Rowachol	May dissolve gallstones
Ox bile / bile salts	Acts as “bile replacement”

In addition to the steps on the last slide, some nutrients and botanicals can promote bile synthesis and metabolism. These include bitters such as dandelion, turmeric, and milk thistle; ginger; phosphatidylcholine; taurine; angelica; beet root; and peppermint. If the patient is having issues with fat digestion with floating or clay-colored stools, abdominal pain after eating meals high in fat, or a positive fat stain on stool test, you can use these to promote healthy bile synthesis and metabolism. Phosphatidylcholine has been shown to prevent and possibly dissolve gallstones. Some studies have found biliary phospholipid concentrations are lower in patients with gallstones than in those without.

Vitamin C may protect against gallstones. It is a cofactor for the enzyme 7A-hydroxylase, which is the rate-limiting step in the conversion of cholesterol to bile acids. In the NHANES III cohort, there was a significant inverse association between serum vitamin C levels and the prevalence of gallbladder disease. In a study of patients with gallstones, daily supplementation with 2 g of vitamin C for two weeks decreased the lithogenicity of bile.

Another option is Rowachol, which is a blend of six plant monoterpenes, and it has been shown to inhibit the formation of cholesterol crystals in bile. In clinical trials, treatment with Rowachol for six months resulted in complete or partial gallstone dissolution in 29 percent of 27 patients with gallstones.

Finally, you can consider using bile itself from either a bovine or ox source, which can help with fat digestion.



Here are some of the products I've used and recommend: BileMin, which has a number of cholagogues to help with bile synthesis and metabolism from Apex Energetics; Stone Free from Planetary Herbals has also botanical cholagogues and bitters; Digestive Bitters from Herb Pharm; Rowachol from Rowa; phosphatidylcholine either from BodyBio and Integrative Therapeutics; and Bile Acid Factors from Jarrow. You wouldn't use all of these products. If someone has gallstones, I'd suggest Rowachol, phosphatidylcholine, and either Stone Free or BileMin. If someone has significant issues with fat digestion, I would suggest Bile Acid Factors from Jarrow, Digestive Bitters, and phosphatidylcholine. You can also use a high dose of vitamin C in any of these cases. I generally prefer a liposomal form at a dose of 2 g per day.

I'm often asked whether gallbladder flushes are a good choice for people with gallstones. This involves consuming a large amount of olive oil plus citrus juice and sometimes Epsom salt, typically after a brief fast. This can cause expulsion of green, yellow, or black blobs in the stool, which look like gallstones, but they are usually not. They are simply bile stain soaps that are produced by partial saponification of the oil, and this is especially likely if the so-called stones are floating on top of the toilet water, as would be expected for a substance made mostly from oil. It is possible that gallstones could be passed by a cleanse because small stones are regularly passed, and a large amount of oil could stimulate a strong gallbladder contraction, as would Epsom salts, which also relax the muscles controlling the release of bile into the gut. The problem is if underlying factors leading to stone formation are not addressed, the gallbladder will just create more stones, even if some are passed in the cleanse. I think it is better to focus on addressing the underlying causes than doing these kinds of flushes.

Okay, that's it for this unit. Thanks for watching. See you next time.