Rare Sequalae of Obstructive Jaundice: Hyperferritinemia and Bile Cast Nephropathy

Klevi Golloshi, B.S., Daniel Skaf M.D., Sneha Neurgaonkar, M.D.

Department of Internal Medicine, Emory School of Medicine, Atlanta, Georgia 30322

Introduction

- Obstructive jaundice occurs due to a physical blockage in the biliary outflow tract or external compression.
- While jaundice and scleral icterus are common symptoms initially, long term sequalae include severe systemic manifestations from the buildup of various compounds normally excreted in bile such as bilirubin.
- We present a case in which severe obstruction due to biliary stricture led to markedly elevated ferritin levels and bilirubin inducing bile cast nephropathy.

Case Description

- A 67-year-old male smoker presented with 3 weeks of pruritus, acholic stools, dark urine, nausea, vomiting, and 20-pound weight loss.
- Physical exam was notable for jaundice, scleral icterus, and LUQ and epigastric tenderness to palpation, but lacked hepatosplenomegaly, ascites or other stigmata of cirrhosis.
- Liver function tests showed AST 486 IU/L, Alkaline Phosphatase 1419 IU/L, ALT 600 IU/L, and total bilirubin >30.0 mg/dL with direct bilirubin >10.0 mg/dL.
- Ferritin was >7500 ng/mL with decreased transferrin of 159 mcg/dL. Hepatitis panel and malignancy/autoimmune markers were negative. CMP showed BUN 74 mg/dL, and creatinine 5.1 mg/dL with 2+bilirubin on urinalysis and microscopic analysis showing pigmented renal tubular cells, bilirubin crystals, and waxy casts suggestive of ATN due to bilirubin damage and possible CKD given waxy casts.
- CT abdomen reported severe intra and extra hepatic biliary duct dilation with common bile duct (CBD) of 17 mm and abrupt tapering with pancreatic head fullness confirmed with MRCP.

Table 1. Patient's Laboratory test results on and post admission

Laboratory Values	Reference Range	Day 1	Day 5 (3 days post-ERCP)	Day 21
AST	13 – 39 IU/L	486	187	18
ALT	7 – 52 IU/L	600	315	27
Alkaline Phosphatase	34 – 104 IU/L	1419	886	160
Total Bilirubin	0.3 - 1.2 mg/dL	>30.0	13.0	4.4
Albumin	3.5 - 5.2 g/	3.0	2.9	3.4
BUN	7 – 25 mg/dL	74	64	18
Creatinine	0.5 - 1.2 mg/dL	5.1	2.90	1.01
WBC	4 – 11 K/cmm	13.8	17.7	10.1
Hgb	13.7 - 17.5 g/dL	11.9	9.4	8.5
Ferritin	24 – 336 ng/dL	>7500	4677	976
Transferrin	200 to 360 mcg/dL	159		233
Iron	50 - 182 ug/dL	126		61
Iron Saturation		57%		19%
TIBC	250 – 450 ug/dl	233		326

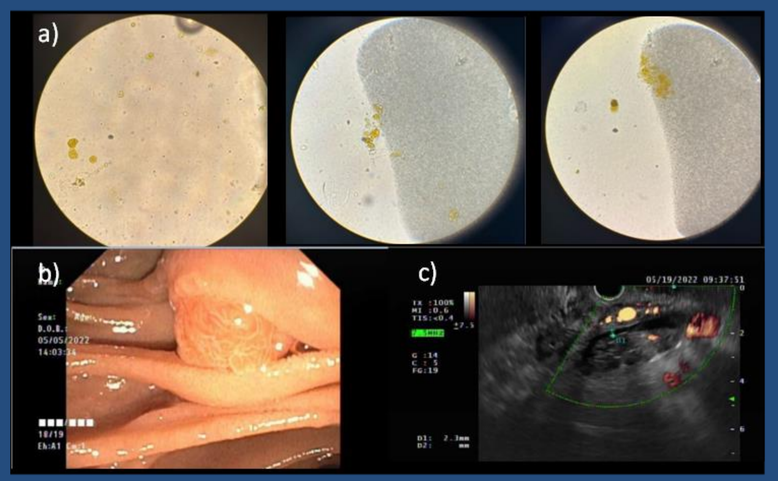

Figure 1. **a)** Bile casts and bilirubin crystals seen on microscopy. **b**) Ampulla prior to ERCP on day 2 shows no periampullary abnormality. **c**) Day 16 - Endoscopic Ultrasound showing narrowing of distal common bile duct to 3.8 mm with a hypoechoic intraductal area measuring 6.3 x 9.6mm.

Final Results

- On day 2, ERCP showed a tight 15mm distal biliary stricture. A small sphincterotomy followed by balloon dilation allowed for placement of a CBD stent with excellent drainage of dark green bile.
- Following ERCP, patient had a drop of liver function tests and ferritin levels, gradual improvement in BUN and creatinine, and was discharged in stable condition on hospital day 6.
- On day 16, endoscopic ultrasound (EUS) revealed a hypoechoic area within the periampullary area measuring 6.3x9.6mm with distal stricture and atypical cells in brushings collected during repeat ERCP.

Discussion

- Obstructive jaundice leads to not only local effects in the biliary tree and liver but also systemic effects due to promotion of the acute inflammation response.
- Ferritin is an acute phase protein that increases in states of inflammation, but also shown to be excreted in bile, primarily in iron overload states.
- Our patient showed a large increase in ferritin, signifying the potential role of biliary excretion of excess ferritin, with unknown ramifications.
- Additionally, severe biliary tree obstruction led to markedly elevated bilirubin, overwhelming renal clearance leading to severe tubular damage and casts.
- With alleviation of obstruction, there was a steady decrease in ferritin and return to normal baseline renal function.
- Further research is needed to clarify both the consequences of excess ferritin in biliary obstruction and the significance of excess bilirubin in renal injury.