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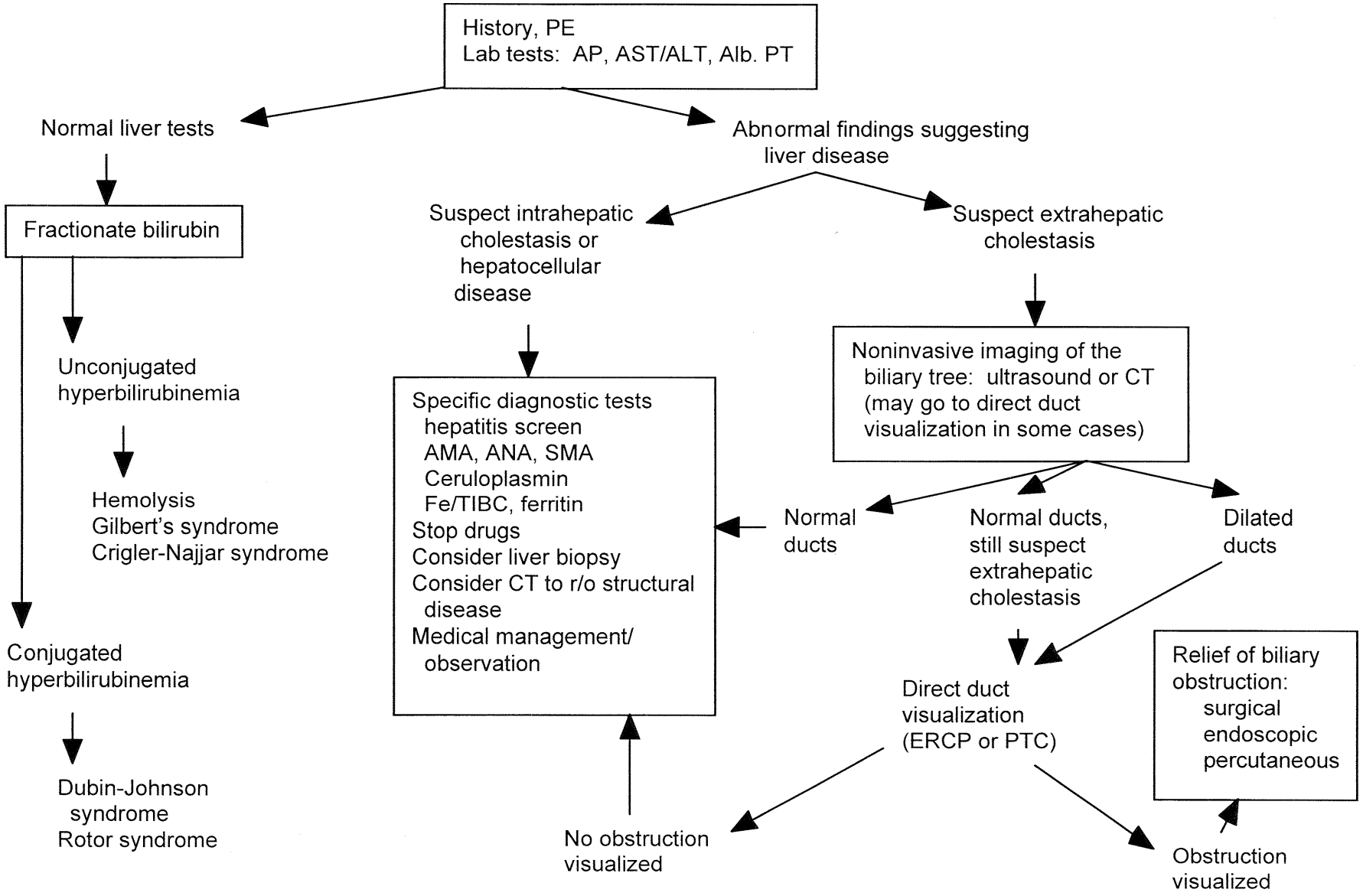
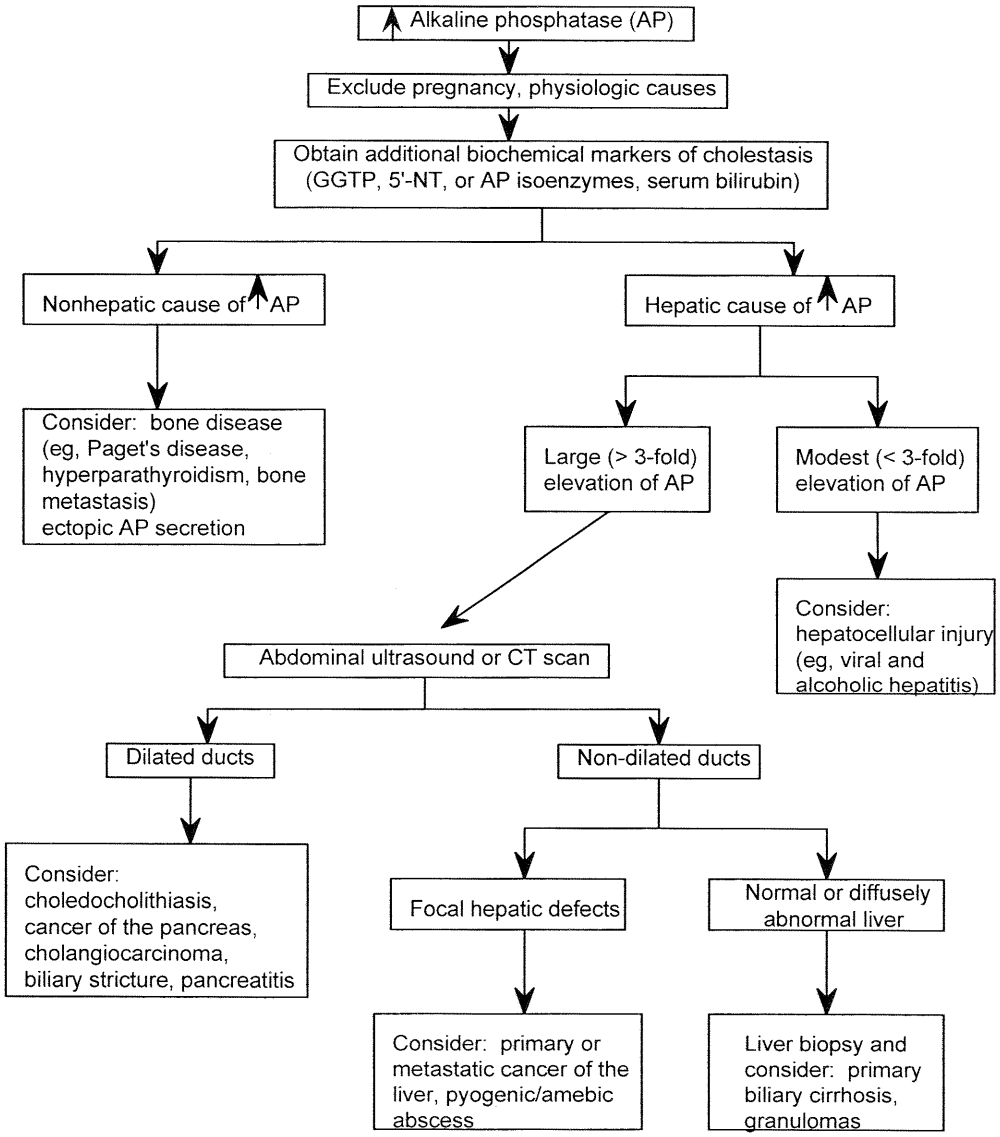
Approach to the Patient with Jaundice (Bilirubin)



Approach to Patient with Increased Alkaline Phosphatase



Modified from: Kelley Textbook of Internal Medicine, 3rd edition, 1997, pp 663.

Analysis of liver tests in patients:

In the lecture hand-out are the liver tests of 9 patients. Please review and try to analyze these cases on your own. Assess the cases for:

1. Cholestatic versus hepatocellular disease
2. Acute versus chronic disease
3. Estimate of liver function (good/poor)
4. Possible diseases (there could be a number of diagnoses for some of these)

My own conclusions are given after the cases - please don't read that page until you have gone through the exercise yourself. Questions - ask me in class or in the early morning question/problem sessions.

Addenda to Syllabus
Liver Tests

Cases

Algorithms

A variety of cases are provided in your syllabus to allow practice in analyzing liver tests.

Try to determine:

1. Type of liver disease
2. Level of liver function (good/poor)
3. Whether disease is acute or chronic, if this is possible from the data given here.

Case 1

Laboratory Findings		
Bilirubin	8.5	(0.2-1.2 mg/dl)
Alkaline Phos.	250	(23-100 IU/ml)
AST	1500	(40-70 IU/ml)
ALT	1750	(40-70 IU/ml)
Albumin	4.0	(3.5-4.5 g/dl)
PT	11.0	(10.5-12.0 sec)

Case 2

Laboratory Findings		
Bilirubin	8.5	(0.2-1.2 mg/dl)
Alkaline Phos.	675	(23-100 IU/ml)
AST	180	(40-70 IU/ml)
ALT	250	(40-70 IU/ml)
Albumin	4.0	(3.5-4.5 g/dl)
PT	11.5	(10.5-12.0 sec)

Case 3

Laboratory Findings		
Bilirubin	3.5	(0.2-1.2 mg/dl)
Alkaline Phos.	190	(23-100 IU/ml)
AST	300	(40-70 IU/ml)
ALT	400	(40-70 IU/ml)
Albumin	4.0	(3.5-4.5 g/dl)
PT	12.0	(10.5-12.0 sec)

Case 4

Laboratory Findings		
Bilirubin	0.8	(0.2-1.2 mg/dl)
Alkaline Phos.	90	(23-100 IU/ml)
AST	2500	(40-70 IU/ml)
ALT	50	(40-70 IU/ml)
Albumin	4.0	(3.5-4.5 g/dl)
PT	11.0	(10.5-12.0 sec)

Case 5

Laboratory Findings		
Bilirubin	9.0	(0.2-1.2 mg/dl)
Alkaline Phos.	200	(23-100 IU/ml)
AST	300	(40-70 IU/ml)
ALT	100	(40-70 IU/ml)
Albumin	3.2	(3.5-4.5 g/dl)
PT	14.5	(10.5-12.0 sec)

Case 6

Laboratory Findings		
Bilirubin	9.0	(0.2-1.2 mg/dl)
Alkaline Phos.	200	(23-100 IU/ml)
AST	2500	(40-70 IU/ml)
ALT	3000	(40-70 IU/ml)
Albumin	4.0	(3.5-4.5 g/dl)
PT	14.5	(10.5-12.0 se)

Case 7

Laboratory Findings		
Bilirubin	1.0	(0.2-1.2 mg/dl)
Alkaline Phos.	555	(23-100 IU/ml)
AST	25	(40-70 IU/ml)
ALT	30	(40-70 IU/ml)
Albumin	4.0	(3.5-4.5 g/dl)
PT	11.5	(10.5-12.0 sec)

Case 8

Laboratory Findings		
Bilirubin	3.0	(0.2-1.2 mg/dl)
Alkaline Phos.	120	(23-100 IU/ml)
AST	85	(40-70 IU/ml)
ALT	95	(40-70 IU/ml)
Albumin	2.0	(3.5-4.5 g/dl)
PT	15.5	(10.5-12.0 sec)

Case 9

Laboratory Findings		
Bilirubin	1.0	(0.2-1.2 mg/dl)
Alkaline Phos.	450	(23-100 IU/ml)
AST	72	(40-70 IU/ml)
ALT	73	(40-70 IU/ml)
Albumin	4.5	(3.5-4.5 g/dl)
PT	11.5	(10.5-12.0 sec)

Liver Test Cases:

1 Hepatocellular disease, probably acute; considerable hepatocyte necrosis, good remaining liver function. Diseases would include acute viral hepatitis.

2 Cholestatic disease with severe impairment of bilirubin excretion with well preserved other liver functions, probably acute. Examples include complete bile duct obstruction.

3 Hepatocellular disease with relatively mild "hepatitis" on a day to day basis. However, elevated bilirubin (although normal PT/albumin) is unexpected for mild liver injury and suggests this could be chronic process that has, over time, destroyed enough liver cells to achieve at least some degree of liver dysfunction (primarily as abnormalities in bilirubin secretion).

4 Isolated marked elevation in AST – this is unlikely to be due to liver disease as all other tests, including ALT, are normal. Look for another organ system that is injured, releasing AST. Most likely muscle necrosis.

5 Hepatocellular process with only mild ongoing liver cell necrosis. Impaired liver function suggests cirrhosis/decompensation and low albumin helps to confirm chronic nature of liver disease. High AST/ALT ratio suggests alcohol as a cause. This picture would be typical of severe alcoholic hepatitis, usually with cirrhosis.

6 Hepatocellular process with marked necrosis of liver cells. Elevated PT but normal albumin suggests acute disease. Increased PT suggests fulminant liver failure. This would be typical of very severe acute viral hepatitis, severe toxicity (due to drugs such as acetaminophen or carbon tetrachloride) or severe ischemic injury to much of the liver.

7. May not be liver disease – look for other causes of alkaline phosphatase elevation as the other liver tests are normal. Otherwise, this represents cholestatic disease that is mild. Good liver function. No evidence of chronicity so you don't know the duration of the problem.

8 Hepatocellular disease with very poor liver function - liver decompensation. This probably represents decompensated chronic cirrhosis.

9. Cholestatic liver disease. Although the alkaline phosphatase is markedly elevated (and AST/ALT are slightly elevated), the bilirubin is not elevated. This often occurs with:

A. Partial obstruction of the bile ducts as sufficient bile still reaches the intestine to eliminate bilirubin.

B. Complete obstruction of some of the bile ducts in the liver but not of all ducts. The rest of the liver (non-obstructed part) usually has sufficient reserve to fully eliminate the daily load of bilirubin.