CAUSES OF JAUNDICE

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CAUSES	EXAMPLES
PREHEPATIC DISORDERS	
1. Neonatal **[Bhandari, 2013; Hansen, 2013]**	Physiological jaundice Increased bilirubin load due to increased RBC volume* Increased enterohepatic circulation ** Decreased uptake by liver – decreased ligandins Decreased conjugation – decreased UDPGT activity Decreased excretion into bile Premature babies Jaundice due to breast feeding Pathological Haemolytic anaemias (Increased destruction of RBC) • Haemolytic Disease of the Newborn (HDN) - Rhesus, ABO incompatibility, allografts • RBC enzyme defects (G6PD deficiency, Pyruvate kinase deficiency), RBC membrane defects (Hereditary spherocytosis), Thalassemia, Drug induced (Vit K, Suphonamides, Nitrafurantoin, Anti-malarials, Penicillin), Sepsis Bleeding • Haemorrhage (in any system) Increased enterohepatic circulation** • Intestinal atresia/ stenosis, pyloric stenosis, Hirschsprung's disease Polycythaemia* Defective conjugation • Congenital deficiency of UDPGT enzyme - Criggler –Najjar • UDPGT inhibition by drugs (Novobiocin) Metabolic conditions • Galactosaemia, Hypothyroidism Decreased binding of bilirubin to albumin • Drugs – Sulphonamides, Penicilin, Gentamycin • Acidosis, Asphyxia, Hypothermia, Hypoglycemia
2. Hemolytic **[Kumar and Clark, 2009; Pratt and Kaplan, 2012; Hansen, 2013]**	Inherited *** Spherocytosis, Elliptocytosis, G6PD deficiency, Pyrvate Kinase deficiency Sickle cell anaemia Acquired Microangiopathic Haemoytic Anaemia (MAHA), Paroxysmal nocturnal haemoglobinuria, spur cell anaemia, immune haemolysis, parasitic infections Infective Malaria, Babesiosis, Leptospirosis Hypersplenism

3. Ineffective erythropoiesis **[Pratt and Kaplan, 2012]**	Inherited Thalassemia Vitamin deficiency Cobalamin (B12), Folate, Iron
4. Inherited disorders **[Pratt and Kaplan, 2012; Hansen, 2013]**	Haematological disorders *** Spherocytosis, Thallassemia, G6PD deficiency, Sickle Cell disease Inability to process /breakdown bilirubin Congenital deficiency of UDPGT enzyme - Criggler Najjar Syndrome, Reduced activity of glucuronyltransferase enzyme- Gilbert's Syndrome
5. Medical treatment **[Stiener, 1944]**	Blood transfusion
6. Drugs **[Pratt and Kaplan, 2012; Hansen, 2013]**	Rifampicin, Probenecid, Ribavarin, RIfamycin
7. Others	Congestive heart failure [van Lingen et al, 2005]

INTRAHEPATIC DISORDERS	
8. Inherited **[Pratt and Kaplan, 2012; Hansen, 2013]**	Cholestasis Inability to secrete conjugated bilirubin - Dubin Johnson Syndrome, Defect in hepatic storage of bilirubin - Rotor Syndrome, Benign Recurrent Intrahepatic Cholestasis Metabolic defects Wilsons disease
9. Autoimmune **[Pratt and Kaplan, 2012]**	Autoimmune Autoimmune Hepatitis*
10. Acquired **[Pratt and Kaplan, 2012; Hansen, 2013]**	Hepatocellular conditions Hepatitis (Viral- A,B,C,D,E / Bacterial) EBV, CMV, Herpes Liver Abscess, Liver Cirrhosis (Alcoholic, Non Alcoholic, Cryptogenic) Primary or Secondary liver malignancies Cholestatic conditions Intrahepatic • Viral hepatitis • Alcohol hepatitis • Drug toxicity ○ Pure cholestasis – anabolic and contraceptive steroids ○ Cholestatic hepatitis – Chlorpromazine, Erthromycin ○ Chronic cholestasis – Chlorpromazine • Primary biliary cirrhosis • Primary sclerosing cholangitis • Sarcoidosis • Inherited ○ Progressive familial intrahepatic cholestasis ○ Benign recurrent cholestasis • Cholestasis of pregnancy • Total parenteral nutrition • Post operative cholestasis • Paraneopastic syndromes • Graft versus Host disease • Infiltrative disease ○ TB, Lymphoma, Amyoidosis • Infection ○ Malaria, Leptospirosis • Alpha 1 antitrypsin deficiency [Hutchison and Hogarth, 2013]
11. Drugs and chemicals	Halothane, Methyldopa, Barbiturates Lead Poisoning, Carbon tetrachloride [Hansen 2013]

POST-HEPATIC DISORDERS	
12. Congenital	Cholestasis Biliary atresia, Choledochal cysts [Pratt and Kaplan, 2012; Hansen 2013]
13. Acquired **[Pratt and Kaplan, 2012; Hansen, 2013]**	Cholestasis Extrahepatic • Malignant ○ Cholangiocarcinoma ○ Pancreatic cancer ○ Gallbladder cancer ○ Ampullary carcinoma • Benign ○ Choledocholithiasis ○ Postoperative biliary strictures ○ Primary scerosing cholangitis ○ Chronic pancreatitis ○ AIDS cholangiopathy ○ Mirizzi's syndrome ○ Parasitic disease ▪ Extraductal - Ascariasis ▪ Intraductal - Clonorchis sinensis and Fasciola hepatica ○ Postoperative stricture formation
14. Autoimmune	Primary Sclerosing Cholangitis, Primary Biliary Cirrhosis [Hansen, 2013]
15. Drugs	Isoniazid, halothane, macrolides (e.g. erythromycin), amoxicillin-clavulanate, azathioprine, chlorpromazine, and several other drugs cause cholestasis, typically with hepatitis. [Padda et al, 2011]

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