Index

Note: Page numbers of article titles are in **boldface** type.

A

Aagenaes syndrome
  cholestasis related to, 290
Age
  as factor in DILI, 194
AGS. See Alagille syndrome (AGS)
AIH. See Autoimmune hepatitis (AIH)
AIP. See Autoimmune pancreatitis (AIP)
Alagille syndrome (AGS), 152
  cholestasis related to, 279–283
  clinical features of, 280–281
  diagnosis of, 281–282
  incidence of, 279–280
  management of, 282–283
    liver transplantation in, 351–352
  prognosis of, 283
Alpha-1 antitrypsin deficiency (A1ATD)
  cholestasis related to, 291–292
Amoxicillin/clavulanate
  cholestatic liver injury due to, 199
Amyloidosis
  hepatic
    cholestasis related to, 306–307
Antibiotics
  cholestatic liver injury due to, 199–200
Antifungals
  cholestatic liver injury due to, 199–200
Antiinflammatory drugs
  cholestatic liver injury due to, 201
Antiretrovirals
  in PBC management, 237
ARC syndrome. See Arthrogryposis-renal dysfunction-cholestasis (ARC) syndrome
Arthrogryposis-renal dysfunction-cholestasis (ARC) syndrome
  cholestasis related to, 289–290
Atresia(s)
  biliary
    liver transplantation for, 350–351
Autoimmune disease(s)
  systemic
    cholestasis related to, 311
Autoimmune hepatitis (AIH)
  clinical spectrum of, 246
Autoimmune hepatitis (AIH) + PBC, 248
  treatment of, 249–250
Autoimmune hepatitis (AIH) + PSC, 248
  treatment of, 250
Autoimmune pancreatitis (AIP), 256
  treatment of, 263–265
Azathioprine
  in PBC management, 234

B
Bacterial infections
  cholestasis related to, 301–304
Bile
  functions of, 147
Bile acid synthesis defects
  cholestasis related to, 285–286
Bile salts
  in pathogenesis of pruritus, 321–322
Biliary atresia
  liver transplantation for, 350–351
Biliary strictures
  dominant
    in PSC
    management of, 219
Budesonide
  in PBC management, 234

C
Cancer(s). See also specific types
  PSC and
    management of, 221
CAR
  biology of, 168–169
  in cholestatic liver diseases, 169
  function of, 168–169
  as therapeutic target, 169–171
Cardiac disease
  cholestasis related to, 310
CD. See Citrin deficiency (CD)
CFALD. See Cystic fibrosis–associated liver disease (CFALD)
Cholangiocarcinoma
  PSC and
    management of, 220–221
    liver transplantation in
      evaluation prior to, 346
Cholangiography
  in PSC, 214–215
Cholangitis
  IgG4-associated, 255–268. See also IgG4-associated cholangitis (IAC)
  secondary sclerosing, 269–277. See also Secondary sclerosing cholangitis (SSC)
Cholestasis, 331–344
  acute  
    in DILI, 196–197  
  care of patient with, 331–344  
  causes of  
    hereditary, 279–300. See also Niemann-Pick type C (NPC) disease; specific causes, e.g., Alagille syndrome  
    systemic, 301–317. See also specific causes, e.g., Fungal hepatitis  
  chronic  
    in DILI, 197–198  
    in PSC  
      complications of, 219–220  
  clinical presentation of, 331–332  
  defined, 161–162, 331  
  described, 147  
  diagnosis of, 331–334  
  differential diagnosis of, 334–336  
  drug-induced, 191–209. See also Drug-induced liver injury (DILI)  
    evaluation of, 332–334  
    fatigue in  
      management of, 337–338  
  genetic determinants of, 147–159. See also specific syndromes  
    itch in, 320–321  
    management of, 336–340  
    osteoporosis and  
      management of, 338  
    progressive familial intrahepatic, 283–285. See also Progressive familial intrahepatic cholestasis (PFIC)  
    TPN-related  
      liver transplantation for, 349–350  
  Cholestatic liver disease(s)  
    CAR in, 169  
    FXR in, 165–166  
    nuclear receptors as drug targets in, 161–189. See also specific types and Nuclear receptors, as drug targets in cholestatic liver diseases  
    PPARs in, 173  
    PXR in, 169  
    UDCA in, 175–176  
    VDR in, 171–172  
  Cholestatic liver disease overlap syndromes, 243–253. See also Overlap syndromes  
  Cholestatic liver diseases  
    liver transplantation for, 345–359. See also specific diseases and Liver transplantation, for cholestatic liver diseases  
  Cholestatic syndromes  
    acquired, 153–156  
      DILI, 156  
      PBC, 153–155  
      PSC, 155  
    inherited, 149–153  
      Alagille syndrome, 152  
      cystic fibrosis, 152–153
Cholestatic (continued)
ICP, 151–152
PFIC, 149–151

Ciliopathy(ies)
cholestasis related to, 293–294

Circulation
pruritogen accumulation in
in pathogenesis of pruritus, 323

Cirrhosis
primary biliary, 229–242. See also Primary biliary cirrhosis (PBC)

Citrin deficiency (CD)
cholestasis related to, 288–289

Citrullinemia type II
cholestasis related to, 288–289

Colchicine
in PBC management, 233–234

Colorectal cancer
PSC and
management of, 221

Computed tomography (CT)
in PSC, 214
CT. See Computed tomography (CT)

Cystic fibrosis, 152–153
Cystic fibrosis–associated liver disease (CFALD)
liver transplantation for, 353

D
Dietary factors
in pathogenesis of pruritus, 323

DILI. See Drug-induced liver injury (DILI)

Drug-induced cholestasis, 191–209. See also Drug-induced liver injury (DILI)

Drug-induced liver injury (DILI), 156, 191–209. See also specific drugs
acute cholestasis in, 196–197
antibiotics and, 199–200
antifungals and, 199–200
antiinflammatory drugs and, 201
chronic cholestasis in, 197–198
differential diagnosis of, 249
drugs against HIV, 201
incidence of, 193
introduction to, 191–192
mechanisms of, 191–192
pathology of, 195–198
pathophysiology of, 198–199
prognosis of, 202–203
psychotropics and, 200
risk factors for, 193–195
age, 194
chemical properties of drugs, 193–194
disease states, 194
genetic determinants, 194–195
suspected
approach to patient with, 192–193
vanishing bile duct syndrome, 195
Dyslipidemia
cholestasis and
management of, 339

E
EHBA. See Extrahepatic biliary atresia (EHBA)
Endocrine dysfunction
cholestasis related to, 310
Environment
in pathogenesis of pruritus, 323
6α-Ethyl-chenodeoxycholic acid
in PBC management, 237
Extrahepatic biliary atresia (EHBA)
in childhood liver disease, 279

F
Fat-soluble vitamin deficiencies
chronic cholestasis and, 220
Fatigue
in cholestasis
management of, 337–338
Female steroid hormones
in pathogenesis of pruritus, 324–325
Fibrates
in PBC management, 236
Fibropolycystic disease of liver
liver transplantation for, 354
Fungal hepatitis
cholestasis related to, 304
FXR
biology of, 162–164
in cholestasis
therapeutic potential of, 166–168
in cholestatic liver diseases, 165–166

G
Gallbladder cancer
PSC and
management of, 221
Gender
as factor in PSC, 229
Genetic(s)
in cholestasis, 147–159
in DILI, 194–195
in pruritus, 323
Index

GR
  biology of, 174
  as therapeutic target, 175
Graft-versus-host disease
  hepatic
    cholestasis related to, 309–310

H
Hemophagocytic syndrome
  cholestasis related to, 307–308
Hepatic amyloidosis
  cholestasis related to, 306–307
Hepatic graft-versus-host disease
  cholestasis related to, 309–310
Hepatic sarcoidosis
  cholestasis related to, 305–306
Hepatitis
  autoimmune. See Autoimmune hepatitis (AIH)
    fungal
      cholestasis related to, 304
Hepatocellular carcinoma
  PSC and
    management of, 221
Histamine
  in pathogenesis of pruritus, 321
HIV. See Human immunodeficiency virus (HIV)
Hormone(s)
  female steroid
    in pathogenesis of pruritus, 324–325
Human immunodeficiency virus (HIV)
  drugs against
    cholestatic liver injury due to, 201
3β-Hydroxy-Δ5-C27-steroid dehydrogenase deficiency (MIM607765), 286
Hypertension
  portal
    cholestasis and
      management of, 339–340
    PSC and
      management of, 220

I
IAC. See IgG4-associated cholangitis (IAC)
IBD. See Inflammatory bowel disease (IBD)
ICP. See Intrahepatic cholestasis of pregnancy (ICP)
IgG4-associated cholangitis (IAC), 255–268. See also IgG4-associated systemic disease (ISD)
  described, 255–256
  diagnosis of, 260–262
  differential diagnosis of, 248–249
introduction to, 255–256
natural history of, 262–263
treatment of, 263–265
IgG4-associated systemic disease (ISD). See also IgG4-associated cholangitis (IAC)
clinical features of, 256–260
clinical manifestations of, 257
demographics of, 256–257
described, 255
diagnosis of, 260–262
histologic features of, 259–260
laboratory features of, 257
natural history of, 262–263
pathophysiology of, 256
radiographic features of, 257–258
treatment of, 263–265
Inflammatory bowel disease (IBD)
in PSC patients
features of, 222
Intrahepatic cholestasis of pregnancy (ICP), 151–152
Ischemia
SSC due to, 272
ISD. See IgG4-associated systemic disease (ISD)
Itch
in cholestasis, 320–321
pain as inhibitor of
in pathogenesis of pruritus, 324
Liver biopsy
in PSC, 215–216
Liver diseases
cholestatic. See Cholestatic liver disease(s)
Liver injury
drug-induced. See Drug-induced liver injury (DILI)
Liver transplantation
for cholestatic liver diseases, 345–359. See also specific diseases
AGS, 351–352
biliary atresia, 350–351
CFALD, 353
cholestasis associated with TPN, 349–350
fibropolycystic disease of liver, 354
overlap syndromes, 352–353
PBC, 348–349
PFIC, 352
PSC, 221–222, 345–348
sickle cell disease, 354
SSC, 274, 353
orthotopic
in PBC management, 235–236
Lymphoma(s)
  cholestasis related to, 308–309

Lysophosphatidate
  in pathogenesis of pruritus, 322

M

Macrolides
  cholestatic liver injury due to, 200

Malignancy(ies)
  cholestasis and
    management of, 340

Metabolic bone disease
  chronic cholestasis and, 220

Methotrexate
  in PBC management, 233

MMF. See Mycophenolate mofetil (MMF)

Mycobacterial infections
  cholestasis related to, 305

Mycophenolate mofetil (MMF)
  in PBC management, 234–235

N

NAIC. See North American Indian childhood cirrhosis (NAIC)

Neonatal ichthyosis-sclerosing cholangitis (NISCH) syndrome
  cholestasis related to, 290–291

Niemann-Pick type C (NPC) disease
  cholestasis related to, 286–288
  clinical features of, 287
  described, 286–287
  diagnosis of, 287–288
  management of, 288
  prognosis of, 288

NISCH syndrome. See Neonatal ichthyosis-sclerosing cholangitis (NISCH) syndrome

North American Indian childhood cirrhosis (NAIC)
  cholestasis related to, 292

Nuclear receptors
  as drug targets in cholestatic liver diseases, 161–189
    CAR, 168–171
    future perspectives on, 176
    FXR, 162–168
    GR, 174–175
    introduction to, 161–162
    PPARs, 172–174
    PXR, 168–171
    UDCA, 175–176
    VDR, 171–172

Nutrition
  total parenteral. See Total parenteral nutrition (TPN)
O

Obstruction
  SSC due to, 271

Opioidergic tone
  in pathogenesis of pruritus, 324

Orthotopic liver transplantation
  in PBC management, 235–236

Osteoporosis
  cholestasis and
  management of, 338

Overlap syndromes, 243–253
  AIH, 246
    defined, 247–248
    described, 243–244
    differential diagnosis of, 248–249
    management of
      liver transplantation in, 352–353
      PBC, 244–246
    prevalence of, 247–248
    treatment of, 249–250

Δ4-3-Oxosteroid 5b-reductase deficiency (MIM235555), 286

P

Pain
  as inhibitor of itch
    in pathogenesis of pruritus, 324

PBC. See Primary biliary cirrhosis (PBC)

Penicillin-resistant penicillins
  cholestatic liver injury due to, 199–200

PFIC. See Progressive familial intrahepatic cholestasis (PFIC)

PFIC1/FIC1 deficiency, 150

PFIC2/BSEP deficiency, 150–151

PFIC3/MDR3 deficiency, 151

Portal hypertension
  cholestasis and
    management of, 339–340

PSC and
  management of, 220

PPARs
  biology of, 172–173
  in cholestatic liver diseases, 173
  described, 172–173
  as therapeutic targets, 173–174

Pregnancy
  intrahepatic cholestasis of, 151–152

Pregnane X receptor (PXR)
  biology of, 168–169
  in cholestatic liver diseases, 169
  function of, 168–169
  in pathogenesis of pruritus, 322
Pregnane (continued)

as therapeutic target, 169–171

Primary biliary cirrhosis (PBC), 153–155, 229–242

cholestasis in

management of, 336
clinical spectrum of, 244–246
defined, 229
diagnosis of, 230

history in, 245–246
laboratory studies in, 244–245
epidemiology of, 229–230, 244
gender predilection for, 229
introduction to, 229–231
management of, 231–238
antiretrovirals in, 237
azathioprine in, 234
budesonide in, 234
colchicine in, 233–234
6α-ethyl-chenodeoxycholic acid in, 237
fibrates in, 236
liver transplantation in, 348–349
methotrexate in, 233
MMF in, 234–235
new approaches to, 236–238
orthotopic liver transplantation in, 235–236
pharmacologic, 231–235
rituximab in, 237–238
tetraethylmolybdate in, 235
UDCA in, 231–233
vitamin D in, 238

Primary biliary cirrhosis (PBC) + AIH, 248

treatment of, 249–250

Primary sclerosing cholangitis (PSC), 155, 211–227

with cholangiocarcinoma

liver transplantation for

evaluation prior to, 346
clinical presentation of, 213
clinical spectrum of, 246–247
diagnosis of, 213–216

cholangiography in, 214–215
considerations in, 216
CT in, 214
history in, 246–247
laboratory findings in, 213
laboratory studies in, 246
liver biopsy in, 215–216
US in, 214
epidemiology of, 212–213, 246
etiopathogenesis of, 211–212
IBD in patients with

features of, 222
management of, 216–222, 336–337
  for cholangiocarcinoma, 220–221
  for colorectal cancer, 221
  for dominant biliary strictures, 219
  for gallbladder cancer, 221
  for hepatocellular carcinoma, 221
  liver transplantation in, 221–222, 345–348
disease recurrence after, 347–348
evaluation for, 346
outcomes following, 346–347
pharmacologic, 217–219
for portal hypertension, 220
natural history of, 212–213
Primary sclerosing cholangitis (PSC) + AIH, 248
treatment of, 250
Progressive familial intrahepatic cholestasis (PFIC), 149–151
cholestasis related to, 283–285
clinical features of, 284
diagnosis of, 284–285
management of, 285
  liver transplantation in, 352
nomenclature associated with, 284
Progressive familial intrahepatic cholestatic (PFIC) syndromes, 149–151
  PFIC1/FIC1 deficiency, 150
  PFIC2/BSEP deficiency, 150–151
  PFIC3/MDR3 deficiency, 151
Pruritogen
  in pathogenesis of pruritus
    accumulation in circulation, 323
    accumulation in skin, 323
Pruritus
  chronic cholestasis and, 219–220
described, 319–320
management of, 337
  advances in, 319–329
pathogenesis of
  advances in, 319–329
  bile salts in, 321–322
dietary factors in, 323
environmental factors in, 323
female steroid hormones in, 324–325
genetic factors in, 323
histamine in, 321
lysophosphatidate in, 322
opioidergic tone in, 324
pain as inhibitor of itch in, 324
pruritogen accumulation in
  in circulation, 323
  in skin, 323
PXR in, 322
serotonergic tone in, 324
PSC. See Primary sclerosing cholangitis (PSC)
Psychotropic drugs
  cholestatic liver injury due to, 200
PXR. See Pregnane X receptor (PXR)

R
Rituximab
  in PBC management, 237–238

S
Sarcoidosis
  hepatic
    cholestasis related to, 305–306
  liver transplantation for, 353
Secondary sclerosing cholangitis (SSC), 269–277
  causes of, 269–273
    immunologic, 273
    infectious, 271–272
    inflammatory, 271–272
    ischemia, 272
    obstruction, 271
  clinical symptoms of, 273
  complications of, 274
  in critically ill patients, 272–273
  described, 269
  diagnosis of, 273
  epidemiology of, 270
  introduction to, 269–270
  management of, 274
    liver transplantation in, 353
    pathogenesis of, 270
    radiologic differentiation in, 273–274
Serotonergic tone
  in pathogenesis of pruritus, 324
Sickle cell disease
  cholestasis related to, 308
  liver transplantation for, 354
Skin
  pruritogen accumulation in
    in pathogenesis of pruritus, 323
Smith-Lemli-Opitz syndrome
  cholestasis related to, 294
Solid organ malignancies
  cholestasis related to, 309
SSC. See Secondary sclerosing cholangitis (SSC)
Systemic autoimmune diseases
  cholestasis related to, 311
Systemic viral infections
  cholestasis related to, 305
T
Tetracyclines
cholestatic liver injury due to, 200
Tetrathiomolybdate
in PBC management, 235
Total parenteral nutrition (TPN)
cholestasis associated with
liver transplantation for, 349–350
cholestasis related to, 311–313
TPN. See Total parenteral nutrition (TPN)
Transplantation
liver. See Liver transplantation
Trimethoprim/sulfamethoxazole
cholestatic liver injury due to, 200

U
UDCA. See Ursodeoxycholic acid (UDCA)
Ultrasound (US)
in PSC, 214
Ursodeoxycholic acid (UDCA)
in cholestatic liver diseases, 175–176
in PBC management, 231–233
US. See Ultrasound (US)

V
Vanishing bile duct syndrome, 195
Variant syndromes. See Overlap syndromes
VDR
biology of, 171
in cholestatic liver diseases, 171–172
function of, 171
as therapeutic target, 172
Viral infections
systemic
cholestasis related to, 305
Vitamin D
in PBC management, 238
Vitamin deficiencies
cholestasis and
management of, 338–339
fat-soluble
chronic cholestasis and, 220

Z
Zellweger syndrome
cholestasis related to, 293