

Index

Note: page numbers in *italics* refer to figures and tables. All anatomical terms and conditions refer to the fetus, unless indicated as maternal.

A

A-mode ultrasound 560
 abdomen
 abdominal ultrasound 122, 123–125
 biometry 144–145, 156–158, 596
 embryology 122, 123
 growth pattern 27, 31
 masses
 cystic 129
 differential diagnosis 326
 ultrasound anatomy 122, 123–125
 wall defects 10
 ventral 301, 302, 303–304, 305–306, 307
 abdominal circumference 13, 141
 crown–rump length relationship 27, 31
 gestational age 582
 estimation 161, 162
 growth curves 591
 head circumference ratio 584
 mean abdominal diameter 590
 weight estimation 163, 603–608, 609
 abdominal diameter
 gastroschisis 304, 306
 mean 590
 sagittal 141
 gestational age 582
 transverse 13, 141
 gestational age 582
 growth curves 591
 abdominal pain, maternal 438, 439, 441, 442
 abdominal pregnancy 41, 42, 74, 77
 abdominal transducer 3, 6
 abdominal ultrasound 3–4, 6–7
 adnexal masses 77, 78
 adrenal glands 126, 127
 choriocarcinoma 68, 73
 circulatory system 100, 101, 102, 103–105
 3-D ultrasound 516–519
 ectopic pregnancy 72, 73–74, 75–77
 examination 3
 fetal anomalies 77, 78, 79
 fetal position 4
 first trimester abnormalities 67–68, 69–72, 73–74, 75–77, 78, 79
 genitalia 129, 130–131
 head 82–83, 84–89
 heart 106–121
 image orientation 3–4, 7
 IUD in early pregnancy 68, 70–71
 limbs 132–133, 134–136
 molar pregnancy 68, 71
 pelvimetry 55
 pelvis 126, 128
 pregnancy detection 60–61, 63–64
 puerperium 443, 444–445
 scan planes 4, 7
 spinal column 90, 91–92

thorax 97, 98–99
 transducer 3, 6
 transverse scans 4, 7
 urinary tract 126, 127–128
 uterine fibroids 77, 78, 79
 abdominometry 141, 148–149
 abortion
 abembryonic 33
 complete 33, 34–35, 67, 69, 464
 incomplete 33, 35, 464
 inevitable 33, 34, 67, 69
 missed 33, 35, 36, 68, 70, 464–465, 466
 blood flow 459, 460, 461
 prognostic factors 33
 risk 26
 cervical implantation 60
 spontaneous 32–33
 abdominal ultrasound 67–68, 69–70
 amniocentesis risk 531
 chorionic villus sampling 534
 fetoscopy 541
 spiral artery abnormal transformation 462
 threatened 32–33, 67, 69
 tubal 38, 40, 74, 76
 acardia 429, 430
 acetylcholinesterase (AChE) 253
 epidermolysis bullosa hereditaria 360
 achondrogenesis 337, 341, 345
 achondroplasia 337
 3-D ultrasound 526
 heterozygous 344, 346–347
 homozygous 344
 acidemia, fetal 490, 492
 ACOG (American College of Obstetricians and Gynecologists) 8
 ADAM syndrome *see* amniotic band sequence/syndrome
 adnexal mass 74, 75–76
 abdominal ultrasound 77, 78
 benign 49, 52
 detection in early pregnancy 77, 78
 malignant 49, 52
 see also ovarian entries
 adrenal glands 126, 127
 biometry 144, 157
 congenital neuroblastoma 324, 325–326
 intra-adrenal hemorrhage 324, 326
 tumors 324, 325–326
 adrenogenital syndrome 545
 clitoral hypertrophy 330, 332
 age
 maternal 416
 see also gestational age
 Aicardi syndrome 235
 albumin replacement fetal therapy 549, 550
 alcohol abuse 206
 paternal 565
 alcohol embryopathy 565
 alkaline phosphatase activity 340
 allylestrenol, oral maternal 176
 alpha fetoprotein (AFP)
 amniotic fluid 10
 gestational age 530–531
 maternal serum 10
 uterine artery waveforms 475
 alpha fetoprotein (AFP) assay
 anencephaly 212
 cephalocele 213
 epidermolysis bullosa hereditaria 360
 exencephaly 213
 gastroschisis 304
 iniencephaly 214
 maternal diabetes 178
 omphalocele 303
 spina bifida 253
 amelia 349, 350
 American College of Obstetricians and Gynecologists (ACOG) 8
 amino acids, intra-amniotic instillation 176
 amiodarone fetal therapy 546, 547–548
 amniocentesis 13, 530–531, 532, 533
 amniotic fluid volume 531
 continuous ultrasound guidance 531, 532
 cytogenetics 533
 decompression 553, 555
 duodenal atresia 298
 early 533
 high-risk pregnancy 14
 hypothyroidism 546
 indications 530
 nonviable pregnancy 531
 postprocedure ultrasound 531
 rhesus incompatibility 186
 risks 531, 532
 serial 553, 555
 spina bifida 253
 technique 530–531, 532
 transplacental 531
 twin–twin transfusion syndrome 426–427
 amnioinfusion 314, 316, 540, 541, 553, 555–556
 autosomal-recessive polycystic kidney disease 315
 serial 556
 amnion, unfused 364, 365, 400, 401
 amnionicity 416, 417
 assessment in second/third trimester 423, 424
 amnioperitoneal sleeve 304, 306
 amniotic band sequence/syndrome 213, 215, 306, 307, 401–402
 anencephaly differential diagnosis 212
 body stalk anomaly differential diagnosis 304, 306
 club foot 353
 exencephaly differential diagnosis 213
 extremity anomalies 336
 pentology of Cantrell differential diagnosis 264

amniotic band sequence/syndrome 213, 215, 306, 307, 401–402
 peromelia 351, 352
 amniotic bands, unfused 400, 401, 402
 amniotic cavity 19, 24, 60, 63
 diameter 27, 29, 579
 growth pattern 27, 30
 amniotic epithelium 26
 amniotic fluid 409–411, 411–413
 absorption 409
 biophysical profile 171
 drainage 426–427
 functions 409
 index 410, 412, 601
 missed abortion 35, 36
 production 409
 quantification methods 409–410, 411–413
 swallowing 169
 third screening 13
 volume 11
 abnormal 13, 207, 410–411, 412–413, 553, 555–556
 amniocentesis 531
 assessment 409–411, 411–413
 3-D ultrasound 519
 determination 312
 fetal therapy for abnormal 553, 555–556
 normal 409
 regulation 409, 411
 spina bifida detection 253
see also anhydramnios; oligohydramnios; polyhydramnios
 amniotic membrane
 development 18, 22
 nuchal translucency detection 77, 78
 separation 531, 532
 amniotic septostomy 555
 anal atresia 299, 300, 321
 anasarca 359
 anemia
 cordocentesis diagnosis 538
 fetal 12
 fetal therapy 548
 intracardiac transfusion 549, 550
 nonimmune hydrops 191
 rhesus incompatibility 501, 502, 503
 anencephaly 212, 214
 chromosomal abnormalities 370
 detection 10, 11
 first trimester 45, 47
 diagnosis 208
 exencephaly differential diagnosis 213
 fetal movement 12, 208
 microcephaly differential diagnosis 225
 Angelman syndrome 568
 angiography, color power 120, 121
 anhydramnios 208, 211, 312, 313, 410–411, 413
 amnioinfusion 553, 555–556
 causes 411
 multicystic dysplastic kidneys 318
 Potter sequence 314
 umbilical cord coiling 484
 anti-D prophylaxis 184, 208
 amniocentesis 531
 cordocentesis 537
 anticoagulant medication 565

anticonvulsants 212, 370
 aorta 107
 ascending 100, 103
 coarctation 278, 280, 282
 color Doppler 112, 117
 descending 102, 103–104, 109, 111
 anemia 501, 502
 arrhythmia evaluation 497, 500
 blood flow classes 488
 blood flow quantitative analysis 484
 Doppler ultrasound 484, 486–487, 488, 497, 500, 614
 end-diastolic flow 487, 488
 pulsatility index 487, 488
 resistance index 487, 488
 dextroposition 112
 diameter 144, 155, 595
 embryo 462, 463
 end-diastolic flow
 absent 507, 508–511, 512
 reverse 508–511, 512
 origin 108, 110, 112
 overriding 273
 tetralogy of Fallot 283, 284
 reverse flow 507
 stenosis 278, 279, 491, 494
 vascular caliber 112
 aortic arch 102, 103, 108, 110, 112
 anomalies 278, 280, 282
 course 117, 118
 hypoplasia 273, 278
 aortic valve 113
 aortocerebral ratio 615
 aqueductal stenosis 218, 228
 arachnoid cyst 220–221, 230
 agenesis of corpus callosum differential diagnosis 221
 aphasia 253
 arachnoid acranus, laser treatment 554
 Arnold–Chiari malformation 222–223, 231–232
 type II 254, 260
 arrhinencephaly 235, 239
 arrhinia 235, 239
 arrhythmias *see* cardiac arrhythmias
 arteriovenous shunts 190
 arthrogryposis multiplex congenita 12, 208, 353, 354, 355
 camptodactyly 353, 354
 club foot 338
 forms 353
 aryepiglottis 93
 ascites, fetal 194–195, 195, 196, 197
 3-D ultrasound 525
 needle aspiration 549
 percutaneous aspiration 539, 540, 549
see also urinary ascites
 asphyxia 171
 detection with cordocentesis 538
 aspiration, amniotic fluid regulation 409
 aspirin therapy in preeclampsia 474–475
 asplenia syndrome *see* isomerism
 assisted reproductive technologies 416
 atrial extrasystole, blocked 291, 292
 atrial fibrillation 501, 502
 atrial flutter 293, 295, 501, 502
 fetal therapy 546

atrial natriuretic peptide (ANP) 189
 atrial septal defect 280, 282–283
 atrial septum 109, 111
 atrioventricular block, second-/third-degree 292–293, 295
 atrioventricular canal 281, 283, 284
 complete 283, 284
 karyotyping 380
 STIC technique 527
 atrioventricular concordance 107
 atrioventricular septal defect 281, 283, 284
 atrioventricular valve 114, 115
 auricle *see* ear
 auricular root 83, 89
 anomalies 238, 241
 autonomy 572–573
 axillary vessels 104

B

B-mode ultrasound
 aortic stenosis 278, 279
 atrial septal defect 280, 282
 atrioventricular septal defect 281, 283, 284
 cardiac biometry 113
 coarctation of aorta 280
 descending aorta 484, 486–487, 488
 DORV 285, 287
 fetal breathing 97
 heart 106, 108–109
 heterotaxia syndromes 286, 288, 289, 291
 hypoplastic left heart syndrome 276, 277, 279
 IUGR 497
 neck structures 93–94
 placental insufficiency 497
 procedure 454
 pulmonary atresia 274, 275
 pulmonary stenosis 277
 risk assessment 560
 tetralogy of Fallot 283, 284
 total/partial anomalous pulmonary venous return 289–290, 291
 transposition of the great arteries 285, 286, 287
 tricuspid atresia 273, 274
 tricuspid dysplasia 275
 truncus arteriosus 286
 ventricular septal defects 281, 282
 bag sign 200, 201
 Ballantyne syndrome 193
 banana sign 12, 16
 Arnold–Chiari malformation 222, 231
 spina bifida 255
 Bart hemoglobin 191
 Beckwith–Wiedemann syndrome
 macroglossia 237
 omphalocele 303
 behavior, fetal 168–172, 173
 states 170–171, 173
 Belgian Multicenter Study 9
 beta mimetics 475
 betamethasone
 fetal behavior 171
 fetal lung maturation 545
 biliary anomaly, intrahepatic 315

biliary dysgenesis 315
biometry
abdomen 144–145, 156–158
abdominometry 141, 148–149
amniotic cavity diameter 27, 29, 579
basic 140–142, 147–150
bone 145–146, 158–159
documentation 140
equipment settings 139
extended 142–146, 151–159
first trimester 61–62, 66
gestational age 579–581
gestational age 139
first trimester 579–581
second/third trimesters 582–601
growth charts 140
growth disturbances 175, 179
head 142–143, 151–153
heart 113
indications 139
neck 142–143, 151–153
structures 94, 96
organ 142–146, 151–159
pelvis 144–145, 156–158
placenta 389, 391
abnormal 393, 396, 397, 398
points 139–140
prerequisites 139–140
reference plane 140, 141
defining 139
second/third trimesters 139–159
gestational age 582–601
serial 13
skeletal 141–142, 149–150
synopsis 578
thorax 143–144, 154–155
transvaginal 26–28, 29–31
umbilical cord 404, 407
see also biparietal diameter (BPD); cephalometry; crown–rump length; specific organs
biophysical profile 171
biotin fetal therapy 545
biparietal diameter (BPD) 9, 13, 27, 29, 31, 140–141
11th week of menstrual age 19, 24
crown–rump length relationship 27
gestational age 28, 31, 580, 581, 582, 602
estimation 161, 162
growth curves 140–141, 148, 591
head circumference 585–590
outer-to-inner/outer-to-outer 139
pelvimetry true conjugate 56
weight estimation 163, 603–608
birth
circulatory system changes 100
length 163, 166, 611
birth weight 163, 166, 611
neonatal mortality 163
twins 612
blastopathies 204
blood flow, antegrade/retrograde 448
blood group determination 538
blood loss, fetal 191
blood transfusion
intra-abdominal for rhesus incompatibility 549

intracardiac for anemia 549, 550
intrauterine
intravascular 503, 550
ultrasound guidance 550
intravascular via cordocentesis 548
nonimmune fetal hydrops 549
planning 538
blood vessels, development 19, 25
body contour, abnormal 208, 211
body parameters, third ultrasound screening 13
body stalk anomaly 304, 306
bone(s)
biometry 145–146, 158–159
cartilaginous epiphyses 132, 133
disorders 142
fractures in osteogenesis imperfecta 343, 344, 346–347
length and gestational age 583
long tubular 132, 133
measurement 141–142, 149–150
mineralization and pulsed Doppler 561
tissue 132
Bourneville–Pringle disease 190
nonimmune hydrops 193
bowel
biometry 144, 157
congenital closure of segment 297
embryology 122
hyperechoic structure 366, 367
loop
extrusion 303–304, 305–306
floating 304, 305
ultrasound anatomy 122, 125
brachial artery 104
brachial palsy 163
brachiocephalic trunk 93, 96
brachycephaly 225
bradyarrhythmias 292–293
fetal anomalies 211
management 294
nonimmune hydrops 190
severe 501, 502
brain
anatomy 82, 83, 84, 86, 87, 88
development 18, 21–22, 23
embryology 81
malformations in Mohr syndrome 236
mantle 83, 89
brain death syndrome, intrauterine 171, 173
brain-sparing effect
cerebral vessels 490–491, 492
hypoxemia 490
neuromotor development 509
branchiogenic cyst 248, 251
breathing 83, 87, 94, 96, 97, 99
movements 168–169
biophysical profile 171
end-diastolic flow 508
breech presentation 3–4, 7
fetal–pelvic index 55
head shape 13, 82, 84
spina bifida detection 253
third screening 13
bronchogenic cyst 262–263, 266
CCAM differential diagnosis 262
bubble sign 201

C

calcaneus, rocker-bottom foot 353, 354
calcification
hepatic 307, 308
intra-abdominal 382, 384
intracranial
cytomegalovirus 380
neoplasms 223
meconium peritonitis 301
sacrococcygeal teratoma 333
calcium antagonists 476
calvaria
hypomineralization 339, 340
ossification defect 526
osteogenesis imperfecta 343, 344, 347
Campbell–Wilkin formula for weight estimation 164
camptodactyly 353, 354
Pena–Shokeir syndrome 355
camptomelic dysplasia 338, 343
hermaphroditism 329, 331
carboxylase deficiency, multiple 545
cardiac apex 111
cardiac arrhythmias 118, 119, 290, 291, 292–293, 294–295
classification 490
descending aorta Doppler tracing 497, 500
diagnosis 490
differential diagnosis 292
Doppler ultrasound 501, 502
fetal therapy 550
heart defects 208
inferior vena cava Doppler tracing 497, 500
nonimmune hydrops 190, 197
see also specific arrhythmias
cardiac axis 111
cardiac compensation, TRAP sequence 430
cardiac output 143
cardiac preload 497, 499–500, 502
cardiac preset 106
cardiac rhythm 111
cardiac volume overload 190
cardiomegaly 113
Coxsackie infection 378
cardiomyopathy 118
dilatative 278, 279, 290
hypertrophic 290
nonimmune hydrops 190, 197
cardiothoracic (CT) ratio 113, 144, 155
cardiotocography 169
Carnegie classification 17
carotid artery
common 93, 488
Doppler ultrasound 490, 492
internal 462, 488
brain-sparing effect 490
Doppler ultrasound 489, 490
inferior regression syndrome
diabetes mellitus 178
sirenomelia 351
cavitation 561, 562
cavum septi pellucidi 82, 83, 85, 86, 89
biometry 142, 151, 152, 592
cebocephaly 235, 239

- central nervous system (CNS)
 anomalies 217–226, 227–233
 chromosomal abnormalities 370
 cephalic presentation 3, 7
 cephalocele 213, 215–216
 cephalometry 46, 140–141, 147–148
 cephalopelvic disproportion 55
 prediction 56
 cephalothoracopagus 429, 431
 cerebellar artery, superior 490
 cerebellar diameter, transverse 142, 151, 152
 gestational age estimation 161, 592, 602
 cerebellum
 biometry 142, 151, 152
 bowing 12, 16
 ultrasound anatomy 82, 83, 86, 89
 cerebral arteries 462, 463
 anterior 490
 brain-sparing effect 490–491, 492
 Doppler ultrasound 487, 488, 489, 490–491, 492
 end-diastolic flow 489, 490
 frequency spectrum recording 488, 489
 middle 488–489, 492
 anemia 501
 arteriovenous malformations 491, 492
 brain-sparing effect 490, 492
 cerebroplacental ratio 490
 Doppler ultrasound 614
 resistance indices predictive value 490–491
 pulsatility index 489, 490
 resistance index 489, 490
 cerebral arteriovenous malformations 491, 492
 cerebral autoregulation loss 490, 492
 cerebral blood flow 102, 103, 488
 cerebral dysfunction, cavum septi pellucidi size 142
 cerebral hemispheres
 biometry 142, 151–152
 development 18, 24
 ultrasound anatomy 82, 84, 86, 88
 cerebral hemorrhage
 absent end-diastolic flow 510
 intrauterine 223, 232
 premature labor 491
 cerebral ventricles 83, 88
 biometry 142, 151
 dilatation 366, 367
 lateral 82, 83, 83, 84, 89
 biometry 142, 151
 cerebral ventricular–hemispheric ratio 142, 151, 152
 hydrocephalus 217
 cerebral ventriculomegaly 376
 hydrocephalus 381, 384
 cerebro-oculofacioskeletal (COFS) syndrome 353
 cerebromedullary cistern 83, 89
 cerebroplacental ratio 490
 cervical carcinoma 49, 52
 cervical cerclage 50
 cervical incompetence 14, 438, 439
 diagnosis 49–50, 52–53
 cervical os, internal 2
 cervical pregnancy 38, 41, 42, 74, 76
 cervical vessels 93
 cervix
- anatomy 49
 length 438
 opening 50, 53
 palpation 50
 physiology 49
 shortening 50
 ultrasound 50, 52–53
 cesarean section
 follow-up 443, 445
 intrauterine death of one twin 427
 champagne-cork phenomenon 337, 338, 342, 345
 chemotherapy monitoring 465
 chickenpox *see* varicella syndrome
 cholezystolithiasis 438, 441
 choledochal cysts 308, 309
 chondrodysplasia punctata
 anticoagulant medication 565
 Conradi–Hünermann type 348
 embryopathica 348
 nonfatal 340
 rhizomelic type 338, 340–341, 345
 X-linked dominant 360
 chondroectodermal dysplasia *see* Ellis–van Creveld syndrome
 choriocarcinoma 36, 37, 68, 72, 73
 abdominal ultrasound 68, 73
 chorion, unfused 364, 365, 400, 401
 chorion frondosum 17, 388, 458
 chorionic villus sampling 533–534
 chorion laeve 60
 chorion villus sampling
 chondrodysplasia punctata 341
 rhesus incompatibility 186
 chorionic cavity 60, 63–64
 diameter 579, 580
 chorionic sac 17, 20
 detection 26
 growth rate 26, 30
 mean diameter 26, 29
 gestational age 28
 missed abortion 35, 36
 chorionic villus sampling 13, 532, 533–534, 535
 high-risk pregnancy 14
 problems 534
 risks 534
 technique 532, 533–534, 535
 chorionicity 416, 417, 418
 assessment in second/third trimester 423
 choriorretinitis 380
 choroid plexus 18, 22
 blood flow 462
 cyst 221–222, 231
 chromosomal abnormalities 364, 365
 ultrasound anatomy 82, 83, 83, 84, 89
 chromosomal abnormalities 205
 3-D ultrasound 520
 empty gestational sac 33
 genetic counseling 566, 570
 growth retardation 381
 high-risk pregnancy 14
 multiple pregnancies 421, 423
 nonimmune hydrops 190
 nuchal translucency 10–11, 16, 78, 363–364, 365
 trisomy 45, 78
 phenotypic expression 368, 371, 372
 proportional growth retardation 12, 176
- renal anomalies 320, 321
 spina bifida 255
 twins 427, 430
 ultrasound suggestive signs 363–372
 16–24 weeks 364, 365–366, 367
 abdominal wall 371
 borderline dilatations 366, 367
 early 363–364, 365
 gastrointestinal tract 371
 limbs 366, 368, 369
 pelvic bones 366, 368, 369
 placental 369
 specific 370–371
 umbilical cord 368, 369
 urogenital system 371
 chromosome analysis, abortion products 32
 chyloperitoneum 194
 chylothorax 192, 196, 197, 261–262, 265
 percutaneous drainage 549, 550
 percutaneous procedures 539, 540
 shunt procedures 551
 cine loop 106
 heart biometry 143, 154
 circle of Willis 487, 488, 489, 490
 circulation/circulatory system 100, 101, 102, 103–105, 481–503
 arterial system 481–496
 changes at birth 100
 embryology 100, 101
 hyperdynamic 501
 physiology 481, 482
 shunts 481
 streamlining of blood flow 481
 ultrasound anatomy 100, 102, 103–105
 venous system 495, 496, 497, 498–500
 cisterna magna 82, 86
 biometry 142, 151, 152, 592
 obliteration 222, 232
 clavicles 97, 98
 biometry 145, 158, 599
 ossification 347, 349
 cleft lip/palate 83, 236–237, 240–241
 chromosomal abnormalities 370
 differential diagnosis 339
 intrauterine surgery 554
 syndromes 567
 clefts, dorsal/ventral, 3-D ultrasound 518, 524–525
 cleidocranial dysplasia 145, 347, 348–349
 clinodactyly 353, 354
 clitoris 129, 131
 hypertrophy 330, 332
 cloaca
 malformation 319
 persistent 321
 clotting factors 538
 cloverleaf skull 224, 232
 differential diagnosis 339
 thanatophoric dysplasia 341, 346
 coagulation disorders 202
 coagulation tests, maternal 427
 coagulopathy
 fetal 538
 maternal 427
 coarctation of aorta 278, 280, 282
 collodion baby 360

- colon
 atresia 298, 299, 300
 diameter 596
 loops 144, 157
 color Doppler 280, 282, 289, 291, 449, 450
 aliasing 116, 450, 451
 aorta 112, 117
 aortic stenosis 278, 279
 atrioventricular septal defect 283, 284
 blighted ovum 464
 chemotherapy monitoring 465
 circulatory system 100, 102, 103–105
 coarctation of aorta 280
 color encoding 449, 450
 DORV 285, 287
 early pregnancy loss 464–465, 466
 echocardiography 116, 117, 118, 119
 equipment settings 449
 great vessels 112, 117
 hypoplastic left heart syndrome 277, 279
 intervillous blood flow 459, 460, 461
 M-mode 118, 119
 molar pregnancy 36, 37
 neck structures 94
 power 120, 121
 pulmonary atresia 274, 275
 pulmonary stenosis 276, 277
 pulmonary trunk 112, 117
 tetralogy of Fallot 283, 284
 total/partial anomalous pulmonary venous return 290, 291
 transposition of the great arteries 285, 286, 287
 transvaginal ultrasound 458
 tricuspid atresia 273, 274
 tricuspid dysplasia 275
 truncus arteriosus 286
 twin–twin transfusion syndrome 426, 428
 umbilical artery 482
 umbilical vein 482
 ventricular septal defects 281, 282
 yolk sac blood flow 460, 461
 complete congenital heart block 292–293, 295
 computed tomography (CT), pelvimetry 56
 conception 60
 conceptual age 17
 condition, fetal 171
 congenital cystic adenomatoid malformation (CCAM) 192, 262, 265–266
 chromosomal abnormalities 370
 congenital high airway obstruction syndrome (CHAOS) 192, 249
 Conradi–Hünermann disease 340, 348
 continuous-wave Doppler 449
 contrast agents 561
 cordocentesis 535, 536–539
 blood disease diagnosis 538
 complications 536, 539
 fetal therapy 548–549
 high-risk pregnancy 14
 hydrocephalus diagnosis 381
 hyperthyroidism 546
 hypothyroidism 546
 indications 536, 537–538
 infection diagnosis 537–538
 karyotyping 537
- placenta location 537
 rhesus incompatibility 185–186
 risks 536, 539
 technique 535, 536–537
 thrombocytopenia fetal therapy 548–549
 umbilical artery 537
 umbilical vein 535, 537
 umbilical waveforms 483
 Cornelia de Lange syndrome 237
 corpus callosum 83, 87, 89
 agenesis 221, 230
 arachnoid cyst differential diagnosis 221
 chromosomal abnormalities 370
 corpus luteum cyst 77, 78
 corpus luteum of pregnancy 61, 64, 65
 cortex 82, 83, 84
 corticosteroids
 fetal behavior 171
 toxoplasmosis 376
 counseling
 aims 564–565
 chromosomal abnormalities 566, 570
 fetal anomalies
 genetic 564–568, 569–571
 prenatal diagnosis 208
 genetic syndromes/associations/sequences 567–568
 imprinting 568
 invasive prenatal diagnosis 530
 key questions 564–565
 monogenic hereditary disorders 566–567, 571
 recurrence risk estimation 565
 risk 568
 specific disorders 565–568
 Coxsackie infection 378
 pericardial effusion 382, 384
 superior bones 81, 83
 sutures 526
 superior roentgen signs 200, 201
 cranium concavities 16
 critical periods
 fetal anomalies 204
 limb defects 565, 569
 Crohn's disease, maternal 565
 crown–rump length 9, 27, 29, 30
 abdomen circumference relationship 27, 31
 biometry 580
 biparietal diameter relationship 27
 femur length relationship 28, 31
 first trimester 62, 66
 gestational age 28, 31, 580, 581
 growth curves 62, 66
 cyclopia 235
 cystic adenomatoid malformation 551
 intrauterine surgery 554
 cystic fibrosis 300
 hyperechoic bowel structure 367
 cystic hygroma 246–247, 250
 chromosome disorders 364, 365, 381, 383
 detection 45, 47, 208
 nonimmune hydrops 190, 192
 unfused amnion and chorion 364
 cystic masses, intrafetal 12, 208
 cystoma, ovarian 77, 78
 cytogenetics
 amniocentesis 533
- chorionic villus sampling 534
 placental biopsy 534
 cytomegalovirus (CMV) 206, 380–381
 cordocentesis 537
 diagnosis 381
 growth retardation 381
 hepatomegaly 382
 hyperechoic bowel structure 367
 intraperitoneal calcifications 382
 microcephaly 380, 382
 nonimmune hydrops 191
 cytotrophoblastic plugs 458
- D**
- 4-D imaging 519, 520, 527
 3-D ultrasound
 capabilities 516
 cardiac diagnosis 520
 Cartesian storage 519, 526–527
 chromosomal abnormalities 520
 data acquisition 516–517, 521
 digital storage 519
 electronic scalpel 519, 525, 527
 external system 517, 521
 fetal anomalies 520
 glass body rendering 518, 526
 image
 animation 518–519, 526
 digital storage 519
 processing 519, 526–527
 quality 519
 internal system 517, 521
 motion artifacts 519–520, 527
 multiplanar display 517, 521
 prenatal diagnosis 516–520, 521–527
 problems 519–520, 527
 surface rendering 518, 521–525
 techniques 516–519
 transparent mode 518, 526
 visualization 517–519, 521–527
 volume
 analysis 519, 526–527
 data storing 516
 digital storage 519
 weight estimation 165
 Dandy–Walker malformation 142, 222, 231
 arachnoid cyst differential diagnosis 221
 posterior fossa cyst differential diagnosis 366, 367
 death, intrauterine 200, 201, 202, 424
 causes 200
 cerebral autoregulation loss 490
 complications 427
 end-diastolic flow, reverse/absent 511
 fetal Doppler use 481, 482
 management 427
 multiple pregnancy 202
 one of twins 427, 428
 ultrasound detection 200, 201
 death, maternal with ectopic pregnancy 73
 decidua, trophoblast invasion 462
 deglutition 94
 DEGUM (German Society for Ultrasound in Medicine) 8

- delivery
 arthrogryposis multiplex congenita 355
 gastroschisis 304
 intrauterine death of one twin 427
 omphalocele 303
 sacrococcygeal teratoma 334
 dermoid cyst
 facial 236, 240
 ovarian 77, 78
 dexamethasone
 adrenogenital syndrome 545
 fetal behavior 171
 fetal lung maturation 545
 dextro-transposition of the great arteries (D-TGA) 285, 287–288
 dextrocardia 208
 diabetes mellitus
 disproportional IUGR 176
 maternal 370
 macrosomia 177–178, 182
 polyhydramnios 413
 teratogenic effect 206
 diaphragm 97, 99
 diaphragmatic hernia 208, 263–264, 267
 bronchogenic cyst differential diagnosis 262–263, 266
 chromosomal abnormalities 371
 intrauterine surgery 553, 554
 polyhydramnios 413
 diastolic blood flow, ductus arteriosus 491
 diastolic notch
 persistent 471, 472, 477
 physiologic 471, 472
 diastrophic dysplasia 347, 348
 dicoumarin 348
 diencephalon 81
 digitalization, maternal 549
 digoxin 293, 295
 fetal therapy 546, 547–548, 550
 dihydralazine 476
 diphenylhydantoin 336
 disseminated intravascular coagulation (DIC) 427
 dolichocephaly 13, 82, 84, 225, 233
 camptomelic syndrome 343
 head circumference 140, 147
 IUGR erroneous diagnosis 177, 181
 Doppler effect 448
 Doppler gain 451, 452
 Doppler shift 448
 Doppler ultrasound
 aliasing 113, 116, 450, 451
 arrhythmias 501, 502
 arterial system 481–496
 cerebral arteries 487, 488, 489, 490–491, 492
 middle 614
 color filter 453, 454
 color gain 451, 452
 common carotid artery 490, 492
 concepts 448–449
 descending aorta 484, 486–487, 488, 614
 development 448
 ductus venosus 495, 496, 497, 498–500, 616
 equipment-related factors 449, 450, 451, 452–453, 454
 examination procedure 454
 examination technique effects on spectrum 453, 454–455
 fetal factors 453, 454–455
 fetoplacental unit 509–511
 flow profile 451, 452
 frequency spectrum 453, 454
 high-risk pregnancy 507
 hydrops 501
 indications 497, 500, 501, 502, 503
 inferior vena cava 497, 500
 insonation angle 451, 452–453, 454
 instrument settings 454, 469
 internal carotid artery 489, 490
 intracardiac waveforms 451, 453
 intrauterine growth retardation 473, 477
 jugular vein 490, 492
 maternal factors 454
 multiple pregnancies 501, 502
 preeclampsia 473–474
 principles 448–457
 pulmonary arteries 491, 492, 494
 pulmonary veins 491, 494
 pulse repetition frequency 449, 451
 renal artery 615
 resistance indices 448
 risk assessment 561
 sacrococcygeal teratoma 501
 sample volume 451, 452, 469, 471
 techniques 449
 third screening 13
 transducer handling 469
 twin-twin transfusion syndrome 426
 umbilical arteries 481, 482, 483–484, 613
 velocimetry 483, 485, 486
 umbilical vein 495, 496, 497, 498, 500
 uterine artery 469, 470, 471, 476, 477, 613
 screening 476
 uteroplacental circulation 469, 470, 471
 variance encoding 450, 451
 vein of Galen aneurysm 501
 venous system 495, 496, 497, 498–500
 wall filter setting 453, 454
 double bubble sign 298, 299, 371
 double-outlet right ventricle (DORV) 275, 284–285, 287
 karyotyping 380
 Down syndrome see trisomy 21
 dropout effect 281
 ductus arteriosus 100, 103
 constriction 190
 Doppler flow measurement 114, 115, 491, 493, 494
 premature closure 190
 pulmonary atresia 275
 pulsatility index 491
 systolic blood flow 491
 ductus venosus 100, 101, 102
 anemia 501, 502
 Doppler flow measurement 114, 115
 Doppler ultrasound 495, 496, 497, 498–500, 616
 frequency spectrum 495, 496, 497, 498
 shunt 481
 duodenal atresia 297–298, 299
 chromosomal abnormalities 371
 dwarfism 177, 181
 achondrogenesis 341, 345
 differential diagnosis 338, 344, 346
 growth disproportion 208
 mesomelic 343
 rhizomelic type chondrodysplasia punctata 340
 thanatophoric 208
 thanatophoric dysplasia 341, 345–346
 dysmelia 349
 dysraphia 253
 dystrophy 509–510

E

- ear 82, 83, 86, 88
 anomalies 238, 241
 auricular tag 238
 development 82
 length 143, 153
see also auricular root
 Ebstein anomaly 275, 276, 277, 382
 fetal hydrops 381, 383
 echocardiography, fetal 14, 270–271
 color Doppler 116, 117, 118, 119
 4-D 519, 527
 M-mode scanning 118, 119
 planes 107, 108, 109
 power color Doppler 120, 121
 scan planes 106–107, 108–110, 111–112
 transvaginal ultrasound 118, 119, 120
see also spectral Doppler echocardiography;
 tissue Doppler echocardiography
 ectopia cordis 264, 267
 ectopic pregnancy 2, 36, 38, 39
 abdominal 41, 42, 74, 77
 abdominal ultrasound 72, 73–74, 75–77
 role 74, 77
 causes 36
 cervical 38, 41, 42, 74, 76
 conservative treatment 41, 42–43
 detection 72, 73, 75
 rate 36, 38
 diagnosis 36, 73
 diagnostic management 38, 40
 frequency 73
 β -hCG test 73, 76
 incidence 36
 indirect signs 38, 39
 interstitial 38, 42, 74
 location 73
 methotrexate transvaginal instillation 38, 41, 42–43
 ovarian 41, 42
 signs 73
 sites 36, 39
 ultrasound detection 38
 ectromelia 349, 350, 351, 352
 Edwards syndrome *see* trisomy 18
 electronic scalpel 519, 525, 527
 Ellis–van Creveld syndrome 347, 348
 short rib–polydactyly syndrome differential diagnosis 343
 embryo/embryo development 61, 63–64
 C-shaped 18, 20–21
 Carnegie classification 17
 early circulation 462, 463

- first trimester 61, 64
 heart activity detection 61, 64
 maximum length 27, 29
 menstrual age
 5th week 17, 20
 6th week 17–18, 20
 7th week 18, 20–21
 8th week 18, 21–22
 9th week 18, 22–23
 10th week 18–19, 23–24
 movement detection 61
 vessel examination 462
embryology
 circulatory system 100, 101
 esophagus 93
 head 81–82, 83
 principles 60
 spinal column 90, 91
 ultrasound 17–19, 20–25
embryonic disk development 60
embryopathies 204, 206
 radiation 206–207
embryotoxic insult 204
encephalocele 213, 215
enchondral ossification 132
 defect 341
end-diastolic flow
 abnormal umbilical waveform 483, 485–486
 absent 483, 485, 507, 508, 512
 diagnosis 508, 512
 neuromotor development 508–511, 512
 obstetric management 511
breathing movements 508
carotid arteries 488
cerebral arteries 489, 490
descending aorta 487, 488
gestational age 508
 reappearance of positive 510
 reverse 483, 507, 508, 512
 neuromotor development 508
 obstetric management 511
 pathoanatomic changes 507–508
umbilical artery 485, 501
 reference range 485
endocardial fibroelastosis 118, 278, 279
endometrium, implantation 458
endovaginal scanners 55
endovasculitis, hemorrhagic 193
enteropathic cytopathic human orphan (ECHO)
viruses 378
environmental factors
 fetal anomalies 207
 multifactorial inheritance 567, 571
enzyme deficiencies 191
epidermolysis bullosa hereditaria 360, 361
 fetoscopy 539
epiglottis 93, 95
epignathus 237, 241, 431
epilepsy, maternal 565
erythema infectiosum 191, 376–377
 see also parvovirus B19 infection
esophageal atresia 169, 248, 251–252, 297, 299
 chromosomal abnormalities 371
esophagus 93
ethics 572–575
 fetal therapy 575
 medical experimentation 575
 prenatal diagnosis 575
 principles 572–575
 right to life 573–574
 value system 572
ethyl alcohol
 limb malformations 336
 see also alcohol abuse
EUROCAT (European Union Registry of Congenital Anomalies and Twins) 8, 204
eutrophic fetus 411
eventration 304, 306, 307
exencephaly 212–213, 215
 anencephaly differential diagnosis 212
 chromosomal abnormalities 370
 microcephaly differential diagnosis 225
exogenous agents
 extremity anomalies 336
 proportional IUGR 176
expiration 94, 96
extra-amniotic coelom 19, 24
extrasystoles 291, 292
extremities, anomalies 336–355
 exogenous agents 336
 genetic defects 336
 limb defects 349, 350, 351, 352, 353, 354, 355
 osteochondrodysplasias 336, 337, 338, 339–344, 345–347, 348–349
eyes
 anatomy 83, 89
 anomalies 370
 development 81
 movements 83, 169
- F**
- face embryology 81–82
 facial anomalies 234–238, 239–241, 370
 3-D ultrasound 518, 524
 facial cleft anomalies 236–238, 240–241, 370
 facial profile
 11th week of menstrual age 19, 24
 12th week 19, 25
 13th week 19, 25
 second/third trimesters 82–83, 86–87
 facial region tumors 235–236, 239–240
 epignathus 237, 241
 facial skeleton development 18, 24
 fallopian tube
 intact 72, 74, 76
 rupture 38, 40, 74, 76
 falx cerebri 18, 24, 82
 family history 565
 fat, body 165
 fatal multiple pterygium syndrome 246
 favism 191
 femoral artery 105
 vascular resistance 493, 496
 femoral circumflex artery 105
 femur 132, 133–134
 biometrics 141–142, 149, 150
 gestational age estimation 602
 fracture 338
 length 27–28, 31
 crown–rump length relationship 28, 31
 dwarfism 181
 gestational age estimation 161, 162
 growth curves 591
 ossification centers 132, 133, 134
 shortening 369
 heterozygous achondroplasia 344, 346, 347
 femur–fibula–ulna syndrome 349, 351
 femur–foot ratio 145, 158, 337, 338
 fetal abnormalities, late-onset 13
 fetal alcohol syndrome, cystic hygroma 246
 fetal anomalies 2
 3-D ultrasound 520
 cardiac biometry 113
 critical periods 204, 565, 569
 definition 204
 detection 204–209, 207–208, 211
 before 24 weeks 9
 first trimester 45–46, 47, 77, 78, 79
 rate 9
 second screening 11
 second trimester 46, 48
 third trimester 46, 48
 diabetes mellitus 178
 diagnostic windows 207
 early detection 10
 multiple pregnancies 423
 embryotoxic insult 204
 environmental factors 207
 equivocal findings 45–46, 47
 etiologic classification 205
 exogenous cause 206
 genetic causes 205–206, 565, 569
 genetic counseling 564–568, 569–571
 growth discordance 424
 high-risk pregnancy 14
 incidence 8, 207
 incompatible with life 208
 intrauterine treatment 208
 likelihood of postnatal survival 208
 limited postnatal survival 207–208
 major 78, 204
 minor 204
 morphogenetic classification 205
 multifactorial cause 206, 207
 multifactorial inheritance 567
 multiple 205
 neonatal management 208
 obstetric management 208
 oligohydramnios 411
 ontogenetic classification 204
 parvovirus B19 377
 prenatal diagnosis counseling 208
 prenatal screening 8–9
 proportional IUGR 176
 recurrence risk 208
 estimation 565
 structural defects 11
 suggestive signs 208–209
 teratogenic insult 204
 three-level concept 8
 transvaginal detection 45–46, 47–48
 treatable after birth 208
 twins 427, 428–429, 430, 431, 432
 ultrasound diagnosis 207–208
 undetectable 208
 see also specific organs and regions

- fetal indication 574
 fetal membranes
 retained 443
 rupture 531
 fetal pole 17, 20
 fetal therapy
 direct 545, 548–549, 550, 551, 552–553,
 554–555
 cordocentesis 548–549
 laser treatment 551, 552, 554
 percutaneous procedures 549, 550, 551, 552
 shunt procedures 551, 552
 ethics 575
 indirect 544, 545–546, 547–548
 prerequisites 544
 surgery 553, 554–555, 555
 see also amnioinfusion
 fetal–pelvic index 55
 fetocide, selective 575
 fetofetal syndrome *see* twin–twin transfusion syndrome
 fetofetal vascular anastomoses 417, 418
 fetomaternal transfusion 191
 fetopathies 204
 fetoplacental unit, Doppler ultrasound 509–511
 fetoscopy 539, 540, 541
 high-risk pregnancy 14
 fetus
 abnormal structures 12
 autonomy 573
 brain structures 2
 development
 11th week 19, 24
 12th week 19, 25
 13th week 19, 25
 first trimester 61, 65
 head 2
 malformations 204
 ossification 61, 65
 position
 abdominal ultrasound 4
 third screening 13
 scan planes 4, 7
 skull 61, 65
 spinal column 61, 65
 fetus papyraceus 201, 202, 427, 428
 fibrin 473
 fibula 132, 134
 fingers 133, 136
 amputation in amniotic band syndrome 401
 thumb radial aplasia 351, 352
 see also polydactyly
 flecainide fetal therapy 546, 547–548
 folic acid
 neural tube defect prevention 256
 prophylaxis 565
 toxoplasmosis 376
 folic acid antagonists 370
 foot 132, 134–135
 biometry 145–146, 158, 159, 600
 club 338, 353, 354
 amniocentesis 533
 3-D ultrasound 518, 525
 diastrophic dysplasia 348
 Pena-Shokeir syndrome 354, 355
 deformities 368, 369
 head circumference 582
 long bone length 583
 occipitofrontal diameter 582
 redating 175
 second/third trimesters 602
 skeletal biometry 141
 umbilical artery waveform patterns 481, 482
 ventricular–hemispheric ratio 142
 yolk sac 579
 gestational edema, proteinuria and hypertension (GEPH) 176
 intrauterine fetal death 200
 gestational sac 60, 63–64
 diameter 61–62, 66
 empty 33, 35
 growth curve 61, 66
 identification 60
 measurement technique 61, 66
 multiple pregnancy 418, 419
 transvaginal scan 460
 unequal size 421, 423
 volume 62, 66
 glucocorticoid fetal therapy 545
 glucose-6-phosphate dehydrogenase deficiency 191
 nonimmune hydrops 193
 glucose tolerance test 178
 goiter 247, 250–251
 golfball phenomenon 366, 367
 Goltz syndrome 145
 gonads 129
 Graves disease 545
 great arteries, transposition of
 complete 285, 287–288
 corrected 285–286, 288
 great vessels
 evaluation 112
 visualization 108, 110, 112
 Gregg syndrome 379–380
 growth
 abnormal 11–12
 disproportional 208
 disturbances 175–178, 179–182, 208
 phases 175
 third ultrasound screening 13
 see also intrauterine growth retardation
 growth charts 140
 growth curves 140
 growth models 140
 long bones 142
 Guérin-Stern syndrome 224
- G**
- gain setting 139
 gallbladder
 biometry 144, 157, 596
 embryology 122
 ultrasound anatomy 122, 124
 gallstones 308, 309
 gametopathies 204
 gastric filling 169
 gastrointestinal tract
 anomalies 297–309
 atresias 297–298, 299, 300
 disease 195
 gastroschisis 303–304, 305–306
 bladder exstrophy 313
 body stalk anomaly differential diagnosis 304
 chromosomal abnormalities 371
 genetic syndromes/associations/sequences 567–568
 genital tract 129
 anomalies 329–330, 331–332
 3-D ultrasound 518, 525
 genitalia
 camptomelic syndrome 343
 embryology 129
 external 129
 ultrasound anatomy 129, 130–131
 German Society for Ultrasound in Medicine (DEGUM) 8
 gestation, multiple 2
 gestational age
 abdominal circumference 582
 abdominal sagittal diameter 582
 amniocentesis 530–531
 assignment 28, 31
 first trimester 61–62, 66
 second/third trimesters 161, 162
 biometrics 139, 579
 biophysical profile 171
 biparietal diameter 28, 31, 580, 581, 582
 chorionic cavity diameter 579, 580
 chorionic sac mean diameter 28
 crown–rump length 27, 28, 31, 580, 581
 dates
 confirmation 176
 error 175, 176, 179, 180
 uncertain 177
 determination 9–10
 end-diastolic flow 508
 estimation curves 161, 162
H
- habituation, fetal 171
 half twin peak 420, 422
 halo sign 200, 201
 hand 133, 136
 deformities 368, 369
 position anomalies 368, 369
 split 351, 352
 see also fingers; polydactyly
 Hanhart syndrome 351
 harlequin fetus 360, 361
 Hashimoto thyroiditis 545

- head
 anomalies 212–241
 3-D ultrasound 518, 524
 biometry 140–141, 142–143, 151–153, 592–593
 spina bifida 255, 259, 260
 camptomelic syndrome 343
 coronal scans 83, 88–89
 development 18, 24
 embryology 81–82, 83
 growth
 discordant 424
 isolated retardation 177, 180, 181
 low-profile pattern 175, 176, 179, 182
 neural tube defects 212–214, 214–216
 osteogenesis imperfecta 343
 sagittal scans 82–83, 86–88
 second/third trimesters 81–83, 84–89
 shape 82, 84
 abnormal 12
 transverse scans 82, 84–86
 ultrasound anatomy 82–83, 84–89
see also biparietal diameter (BPD); dolichcephaly; occipitofrontal diameter (OFD)
 head circumference 13, 140, 147, 148
 abdominal circumference ratio 584
 biparietal diameter 585–590
 dwarfism 181
 gestational age 582
 estimation 161, 162, 602
 growth curves 140–141, 148, 591
 occipitofrontal diameter 585–590
 head/trunk ratio 141, 149
 IUGR 176
 heart
 abdominal ultrasound 106–121
 abnormality differential diagnosis 339
 activity detection 32
 anatomic forms of structures 107
 anomalies 107, 270–295
 chromosomal abnormalities 370, 380, 384
 diagnosis 271, 272–273
 epidemiology 270
 fetal hydrops 381, 383
 with impaired intracardiac blood flow 278
 infections 382, 384
 nuchal translucency 364
 position 272
 prognosis 271, 272
 rubella 380
 survival rates 272
 symptoms 271, 272–273
 atria 107, 110, 111, 112
 B-mode ultrasound 106, 108–109
 biometry 113, 143–144, 154–155, 595
 blood flow 100, 101, 103
 color Doppler 116, 117, 118
 contractility 111
 cystic hygroma congenital defect 246
 3-D ultrasound 120, 121, 520
 detection of embryonic 61, 64
 development 18, 19, 20, 23, 25
 dimensions 113
 examination technique 106
 five-chamber plane 110, 112, 117, 118
 four-chamber plane 106, 107, 108, 109, 111, 117, 118, 119
 abnormal 208, 211
 biometry 143, 154
 golfball phenomenon 366, 367
 hemodynamics 491
 imagers 106
 indications for examination 106
 intracardiac waveforms 451, 453, 462
 location in chest 111
 normal 116, 117, 118
 output percentage distribution 481, 482
 prenatal screening 12
 right heart dominance 481
 screening 106
 segmental approach 107, 109–110, 111–112
 settings 106
 situs inversus 301
 size 111
 systematic analysis of structures 107, 109–110, 111–112
 tissue Doppler image 456
 transducers 106
 tumors 190, 290, 291
 ultrasound anatomy 97, 98
 ventricles 107, 110, 111
 diameters 143
 3-vessel view 118
see also cardiac entries; echocardiography, fetal
 heart block, complete congenital 292–293, 295
 heart disease in nonimmune hydrops 190
 heart failure
 congestive 501
 diaphragmatic hernia 263
 fetal 12
 maternal digitalization 549
 nonimmune hydrops 189
 twin–twin transfusion syndrome 425, 426
 heart rate
 anemia 501, 502
 biophysical profile 171
 documentation 462, 463
 Doppler spectrum effects 453, 454–455
 embryonic 18, 23, 61, 64
 IUGR 497, 500
 monitoring 483, 486
 patterns 169–170, 173
 placental insufficiency 497, 500
 reference range 481, 485
 silent pattern 171, 172, 173
 sinusoidal pattern 171, 172
 HELLP syndrome 438, 441
 acidemia 492
 Helsinki Study 9
 hemangioma 213
 cervical 247–248, 251
 hepatic 307, 308
 hematocoele, retrouterine 74, 75, 76
 hematoma
 abdominal scar 51
 marginal-sinus 33, 34
 peritubal 38, 40, 74, 76
 retroplacental 33, 34
 serial scans 33
 subchorionic 33, 34
 hemodynamics, spectral Doppler echocardiography 113, 115
 hemoglobin, twin–twin transfusion syndrome 426
 hemoglobinopathies 538
 hemolytic disease, fetal hydrops 184–187
 hemophilia 538
 hepatic veins 100, 102
 hepatoblastoma 307
 hepatomegaly 307, 308
 differential diagnosis 382
 hepatosplenomegaly 307
 Down syndrome detection 190
 heptadactyly 338, 353
 hereditary disorders
 monogenic 205, 566–567
 sex-linked 129
 Herlitz junctional epidermolysis bullosa 360, 361
 hermaphroditism 329, 331
 3-D ultrasound 518, 525
 herpes zoster 378
 heterotaxia syndromes 286, 288, 289, 291
 sinus bradycardia 292
 hiccups, fetal 169
 Hirschsprung disease 298, 299, 300
 hitchhiker thumbs 347, 348
 holoprosencephaly 219–220, 229
 arachnoid cyst differential diagnosis 221
 arhinia 235, 239
 chromosomal abnormalities 370
 cleft lip/palate 241
 hypertelorism 234, 238
 microcephaly 380
 proboscis 235
 Holtermüller–Wiedemann syndrome 224
 Holt–Oram syndrome 145
 human albumin therapy *see* albumin replacement fetal therapy
 β-human chorionic gonadotrophin (β-hCG) 11, 32, 68
 ectopic pregnancy 38
 molar pregnancy 36, 37
 serum assay 60
 ectopic pregnancy 73, 76
 human chorionic gonadotrophin (hCG) 475
 humans, radiosensitivity 206–207
 humerus 132, 135
 length growth curves 591
 shortening 369
 hydatidiform mole *see* molar pregnancy
 hydranencephaly 219, 228
 hydrocephalus 12, 13, 217–218, 227, 232
 aqueductal stenosis 218, 228
 arachnoid cyst differential diagnosis 221
 Arnold–Chiari malformation 222
 communicating 217, 218–219, 228
 cytomegalovirus 380
 Dandy–Walker malformation 222, 231
 differential diagnosis 381, 384
 disproportional growth 208
 external 217
 eye movements 169
 internal 217
 intrauterine shunt procedures 551
 lymphocytic choriomeningitis 379
 macrocephaly 177, 182
 misdiagnosis 217, 227
 spina bifida 255, 260
 ventricular–hemispheric ratio 142

hydronephrosis 13, 321
 bilateral 298, 299, 313, 549, 552
 shunt procedures 551, 552
 chromosomal abnormalities 371
 percutaneous drainage 549, 552
 unilateral 549, 551
hydrops
 cardiac arrhythmias 501, 502
 congenital adrenal neuroblastoma 326
 diagnostic algorithm 381, 384
 Doppler ultrasound 501
 immune 12, 381, 384
 delivery 187
 diagnosis 185–186
 exchange transfusion 186–187
 hypoxia 184
 postpartum management 187
 rhesus incompatibility 184–187
 ultrasound features 184–185
intracardiac transfusion 550
Klippel-Trenaunay-Weber syndrome 359
maternal syndrome 193
nonimmune 12, 188–195, 196–198
 abdominal disease 192
 albumin replacement 550
 anemias 191
 associated diseases 189–193
 blood transfusion 550
body cavity aspiration 194
 chromosomal abnormalities 190, 364
 cordocentesis 549
 cutaneous edema 195, 359
 cytomegalovirus 380
 definition 188
 diagnosis 185, 193, 198
 differential diagnosis 381–382, 383–384
fetal therapy 549
 fluid retention 188, 189
 heart disease 190
 heart failure 189
 hypoalbuminemia 538
 incidence 188
 infections 191
 intrauterine blood transfusion 194
 maternal disorders 193
 myotonic dystrophy 193
 neoplasms 193
 parvovirus B19 375
 pathogenesis 188–189
 pharmacologic therapy 194
 placental conditions 193
 prognosis 193
 pulmonary diseases 192, 196, 197
 skeletal dysplasias 192
 testicular hydrocele 329, 331
 thoracic diseases 192, 196, 197
 treatment 194
 ultrasound features 188
 umbilical cord changes 193
 parvovirus B19 375, 376–377, 381, 383
 placental 13
 placental chorioangioma 400, 401
 rhesus incompatibility 503
 sacrococcygeal teratoma 333, 335
 transposition of the great arteries 286
 twin-twin transfusion syndrome 425, 426

hydrothorax 192, 196, 197, 261–262, 265
 aspiration 194
 needle aspiration 549
 percutaneous drainage 539, 540, 549, 550
21-hydroxylase deficiency 330, 545
17-hydroxyprogesterone 330
hygroma, cervical 213
hypertelorism 234, 238, 339
hypertension, pregnancy-induced 510–511
hyperthyroidism 247
 fetal therapy 545–546
hypoalbuminemia 538
hypochondrogenesis 341, 345
hypofibrinogenemia 202
hypophosphatasia 338, 339–340, 345
hypoplastic left heart syndrome 276, 277–278, 279
 pulmonary vein Doppler flow 491, 494
hypotelorism 234, 238
hypothyroidism 247, 250–251
 fetal therapy 546
hypoxemia
 brain-sparing effect 490, 492
 peripheral vasoconstriction 493
hypoxia, vasopressin levels 493

I

ichthyosis congenita 360, 361
 fetoscopy 539
ileal atresia 298, 299
iliac artery
 common 484, 486
 external 471, 472
immune deficiencies 538
immunoglobulin M (IgM) antibodies 537
implantation 60, 458, 460
 bleed 60, 64
imprinting 568
in-vitro fertilization (IVF) 416
indigo carmine 533
indomethacin 476
 polyhydramnios treatment 555
 therapy response monitoring 491, 493
induction, preterm for rhesus incompatibility 186
infections 375
 congenital 191
 cordocentesis 537–538
 differential diagnosis 381–382, 383–384
 malformations 206
 sequelae of intrauterine 375
see also specific organisms and conditions
inferior vena cava 100, 102
 Doppler flow measurement 114, 115
 Doppler ultrasound 497, 500
 streamlining of blood flow 481
inheritance 566–567, 571
 multifactorial 567, 571
iniencephaly 213, 216
inspiration 94, 96
intercostal arteries 102, 104
intercostal-to-phrenic inhibitory reflex 171
interorbital distance 598
diameter 143, 152–153

interstitial pregnancy 38, 42, 74
intertracheal pressure changes 94
intervillous circulation
 commencement 458–459
 development 458–459, 460, 461, 465
 maternal 469, 470
intervillous space 459
intracranial blood vessels 462, 463
intracranial tumors 223, 232
intraplacental hematoma 397, 399
intrauterine brain death syndrome 171, 173
intrauterine contraceptive device (IUD), pregnancy with 36, 37
 abdominal ultrasound 68, 70–71
intrauterine growth retardation (IUGR) 163, 175–177, 179–182
 brain-sparing effect 490, 492
 causes 175, 176
 cordocentesis 538
 cytomegalovirus 380
 definition 175
 diagnosis 175, 176
 differential diagnosis 381
 differentiation 176–177
 disproportional 12, 175–176, 180, 182
 chromosomal abnormalities 364, 365
 Ellis-van Creveld syndrome 347, 348
 heterozygous achondroplasia 344
Doppler ultrasound 473, 477, 497, 500, 501
 early and chromosomal abnormalities 364, 365
 end-diastolic flow, absent /reverse 510–511
 etiology 473, 477
 eye movements 169
 fetal anomalies 208
 gestational age determination 10
 growth parameters 175
 hyperechoic bowel structure 367
 isolated retardation of growth
 head 177, 180, 181
 limb 177, 181
Mohr syndrome 236
neuromotor development 509
oligohydramnios 411
oxygen therapy 503
pathogenesis 473, 477
placental chorioangioma 400, 401
placental insufficiency 497, 500, 501
placental maturity 389
prognosis 175
proportional 11, 175–176, 179, 182
quantification 176–177
rubella 380
single umbilical artery 404
tests 176
third ultrasound screening 13
treatment 176
types 175–176, 179–180, 182
urine production 145
weight estimation 164
intrauterine hematoma 419, 423
intrauterine pregnancy detection 73, 76
intrauterine pressure 475
isomerism 284, 286, 288, 289, 291

J

jaw development 81
jejunal atresia 298, 299
jet phenomenon 536, 539
Jeune syndrome 342
hypophosphatasia differential diagnosis 340
joint contractures
arthrogryposis multiplex congenita 353, 354
diastrophic dysplasia 348
Pena-Shokeir syndrome 355
varicella syndrome 375
jugular vein, Doppler velocimetry 490, 492

K

Kartagener syndrome 301
karyograms 570
karyotyping
chromosome disorders 566, 570
cordocentesis 537
Kell antigen 184
kidneys
anomalies 312–326
biometry 144, 156, 157, 597
cystic diseases 315, 316, 317–318
Doppler ultrasound 493
cysts 312, 313
development 19, 25
diseases 314–315, 316, 317–318
nonimmune hydrops 192, 196
dysplasia 319
multicystic 371
embryology 126, 312, 313
growth curves 144, 156
migration 126
multicystic dysplastic 316, 317–318
multicystic obstructive 318, 320
nonvisualization in Potter syndrome 314
polycystic in syndromes 318
size 126
tumors 324, 325–326
ultrasound anatomy 126, 127
see also renal entries
killing, prohibition against 573–574
Klippel-Feil syndrome 213
Klippel-Trenaunay-Weber syndrome 359, 361
Kousseff syndrome 237
kyphoscoliosis 304
diastrophic dysplasia 348

L

labia majora/minora 129, 131
labor
induction
pregnancy dating 10
preterm for rhesus incompatibility 186
see also premature labor
lacrimal duct cysts 235, 239
lambda sign 10, 16, 420, 422, 423
laryngeal atresia 192, 249, 252
laryngeal width 96
larynx 93, 95

biometry 94, 96
laser therapy, intrauterine 551, 552, 554
arcadius acranus 555
sacrococcygeal teratoma 554
twin-twin transfusion syndrome 426–427, 551, 552
leg function, impaired in spina bifida 255–256
leiomyoma *see* uterine fibroids
lemon sign 16, 208, 211
Arnold-Chiari malformation 222, 231, 232
spina bifida 255
leukemia risk with x-ray pelvimetry 55
levo-transposition of the great arteries (L-TGA) 285–286, 288
limb buds 132
limbs
amputation in amniotic band syndrome 401
chromosomal abnormalities 366, 368, 369
defects 349, 350, 351, 352, 353, 354, 355
chorionic villus sampling 534
critical periods 565, 569
3-D ultrasound 518, 525
isolated 349, 350, 351, 352, 353
development 18, 22, 24
differentiation 18, 22
embryo 61, 64
embryology 132, 133
hypoplasias in varicella syndrome 375, 378, 383
isolated growth retardation 177, 181
lower 132, 133–135
vessels 102, 104–105
malformations
differential diagnosis 339
exogenous agents 336
Mohr syndrome 236
ossification centers 61, 65
osteogenesis imperfecta 343
positional abnormalities 353, 354, 355
restricted motion 353, 354, 355
shortening
diastrophic dysplasia 348
Ellis-van Creveld syndrome 347, 348
patterns 337, 338
ultrasound anatomy 132–133, 134–136
upper 132–133, 135–136
vessels 102, 104–105
see also joint contractures
lipoma, lumbosacral 255, 260
lips
integrity 83, 88
see also cleft lip/palate
lissencephaly 220, 229
Listeria monocytogenes 206
liver
adenoma 307
autosomal-recessive polycystic kidney disease 315
biometry 144, 156, 596
biopsy 539
calcifications 307, 308, 382, 384
cysts 307
disease and nonimmune hydrops 192, 195
embryology 122
growth curves 144, 156
hemangioma 307, 308
hemorrhage/hematoma 438, 441
intrauterine surgery 554
mesenchymal hamartoma 307
tumors 307, 308
ultrasound anatomy 122, 124
lochia retention 443, 445
lung 97, 99
development 261
diameter 594
growth curves 143, 154
fluid 261
maturation induction 545
maturity 389
oblique diameter 261
see also pulmonary entries
lymphadenopathy, cervical 248
lymphocytic choriomeningitis 379, 381

M

M-mode ultrasound
breathing movements 168
color Doppler 118, 119
echocardiography 118, 119
embryonic heart activity 61
eye movements 169
fetal breathing 97, 99
heart biometry 143
risk assessment 560
maceration, fetal 200, 201
macrocephaly 177, 182, 223–224, 232
differential diagnosis 339
heterozygous achondroplasia 344
thanatophoric dysplasia 342, 345
macroglossia 237, 241
macrosomia 177–178, 181–182
causes 177, 178
detection 13
diagnosis 177
disproportional 177, 182
fetal anomalies 208
maternal diabetes mellitus 177–178, 182
neonatal mortality/morbidity 163
prognosis 177
proportional 177, 181
weight estimation 165
Maffucci syndrome 359
magnesium 476
magnetic resonance imaging (MRI), pelvimetry 56
malnutrition, fetal 176
malrotation anomalies 286
mandible, development 18, 24
marginal sinus hematoma 397, 398, 399
maternal age 11, 16
maternal death, ectopic pregnancy 73
maternal disorders 49–51, 52–54
diagnosis 438–439, 439–442
nonimmune hydrops 193
maternal plasma volume 409
maxilla 18, 24
defect 236, 241
mechanical index 562
Meckel-Gruber syndrome 213, 215, 216
camptodactyly 353
clinodactyly 353

Meckel–Gruber syndrome 213, 215, 216
 holoprosencephaly 219
 renal artery resistance index 493
 meconium, echogenic 300
 meconium ileus 298, 300–301, 302
 meconium peritonitis 195, 298, 301, 302
 ascites 539, 540
 medical experimentation 575
 megacystis 320, 518
 megacystis–microcolon–hypoperistalsis syndrome 321
 megaureter 319, 320
 Melnick–Needles syndrome 145
 membranous ossification 132
 meningocele 254
 meningoencephalitis in toxoplasmosis 376
 menstrual age 17
 meromelia 349, 350
 Merz formula for weight estimation 164, 165
 mesencephalon 81
 mesomelia 337, 338
 differential diagnosis 339
 mesonephros 312
 metabolic disorders
 fetal therapy 545–546, 547–548
 nonimmune hydrops 192, 193
 metabolic membranes 508
 metacarpals 133, 136
 metanephros 312
 metencephalon 81
 methotrexate, ectopic pregnancy management 38, 41, 42–43
 methyldopa 476
 microcephaly 177, 180, 224–225, 233
 chondrodysplasia punctata 340
 chromosomal abnormalities 370
 cytomegalovirus 380, 382
 differential diagnosis 339
 disproportional growth 208
 Meckel–Gruber syndrome 216
 rubella 380, 382
 skeletal biometry 141
 transient growth 224
 β -microglobulin 322, 323
 micrognathia 237–238, 241
 chromosomal abnormalities 370
 differential diagnosis 339
 micromelia 337, 338
 achondrogenesis 341, 345
 differential diagnosis 339
 micropenis 329, 331
 microphthalmos 234–235, 239
 microphthalmos–microcephaly syndrome 234
 micturition, fetal 129, 131, 169
 midbrain flexure 18
 midline echo 82, 83–85
 mirror syndrome 193
 miscarriage, recurrent 32
 mitral valve 111
 Mohr syndrome 236
 molar pregnancy 36, 37, 68, 71–72
 abdominal ultrasound 68, 71
 diagnosis 465
 incidence 68, 72
 invasive 36, 37, 68, 72
 partial 68, 71

monopodia 351, 352
 mortality, perinatal
 multiple pregnancies 416
 prolonged pregnancy 503
 mouth
 movements 169
 opening 83, 86
 movement, fetal 168, 169, 173
 biophysical profile 171
 fetal anomalies 208
 prenatal screening 12
see also breathing, movements
 müllerian (paramesonephric) duct 129
 multiple pregnancy 416–433
 amniocentesis 532, 533
 amnioticity 416
 assessment in second/third trimester 423
 chorionicity 416, 418
 assessment in second/third trimester 423
 chromosomal abnormalities 421, 423
 crown–rump length 27
 diagnosis 418, 419
 Doppler ultrasound 501, 502
 fetal anomalies 427, 428–429, 430, 431, 432
 fetal weight estimation 165
 first trimester 418, 419–421, 422–423
 abnormal 421, 423
 frequency 416
 growth
 curves 421, 423
 discordance 421, 423, 424, 425
 high-risk 416
 higher-order 418, 419
 intrauterine fetal death 202
 management 432–433
 nuchal translucency 364, 421, 423
 second/third trimester
 abnormal 421, 424, 425, 426–427, 428–429,
 430, 431, 432
 normal 421, 423
 selective fetocide 575
 sex determination 423
see also twin pregnancy
 multiple pterygium syndrome, fatal 246
 multisystem failure 191
 mummification 202
 mutations, sporadic new 205
 myelencephalon 81
 myelocele 253, 258
 myelomeningocele 12, 16, 253, 254, 259–260
 Arnold–Chiari malformation 222
 3-D ultrasound 524–525
 detection 208
 fetal movement 208
 iniencephaly differential diagnosis 213
 paralysis 255
 myocardial contractility 378
 myocardial insufficiency 497
 myocardial motion imaging 455, 456
 myometrium 458
 infiltration in trophoblastic disease 465
 myotonic dystrophy, nonimmune hydrops 193

N

nasal processes 81
 neck
 anomalies 246–249, 250–252
 biometry 142–143, 151–153, 592–593
 cysts 48
 diseases and nonimmune hydrops 192
 embryology 93
 functional impairment 248–249, 251–252
 malignant tumors 248
 neoplasms 246–248, 250–251
 pouch sign of upper 297
 ultrasound anatomy 93–94, 95–96
 negative pressure amplitudes 560
 neonatal mortality, birth weight 163
 neoplasms
 intracranial 223, 232
 neck 246–248, 250–251
 nonimmune hydrops 193
 nephroma, congenital mesoblastic 324, 325
 nephrosis, congenital (Finnish type) 192, 196
 neural tube defects
 chromosomal abnormalities 370
 diabetes mellitus 178
 head 212–214, 214–216
 syndromes 567
 neuroblastoma
 cervical 248
 nonimmune hydrops 193
 neurocranium 81, 83
 neurology, fetal 171
 neuromotor development, absent end-diastolic flow 508–511, 512
 neuron-specific enolase 326
 nicotine abuse 511
 nifedipine 476
 nitric oxide (NO) donors 476
 Noonan syndrome
 cystic hygroma 246
 pulmonary stenosis 277
 nose 83, 89
 anomalies 235, 239, 370
 development 81
 width 592
 notochord 18
 nuchal fold
 biometry 142–143, 152
 thickened 225, 233
 nuchal ligament 246, 250
 nuchal translucency 10–11, 16, 226
 chromosomal abnormalities 10–11, 16, 78, 363–364, 365
 trisomy 45, 78, 82
 detection in first trimester 45, 47, 77, 78
 measurement 363, 365
 multiple pregnancy 364, 421, 423
 thickness 10–11, 16, 77, 78
 transverse scan 82
 trisomy 21 211
 trisomies 363
 unfused amnion and chorion 364

O

obesity, maternal 454
 obstetric management, fetal weight 163
 occipitofrontal diameter (OFD) 140, 147, 148
 gestational age 582
 growth curves 140–141, 148
 head circumference 585–590
 occipitofrontal midline echo 82, 85
 OEIS (omphalocele, exstrophy, imperforate anus, spinal defects) complex 303, 305
 oligohydramnios 11, 48, 312, 313, 410–411, 413
 amniocentesis 531
 amnioinfusion 555–556
 causes 410–411
 club foot 353
 complications 411
 extremity anomalies 337
 fetal anomalies 207, 411
 fetal movement 208
 fetofetal transfusion syndrome 501
 heart rate pattern 483
 hyperechoic bowel structure 367
 multicystic dysplastic kidneys 318
 obstructive uropathy 319, 322
 Potter sequence 314
 pulmonary hypoplasia 261
 renal artery resistance 493
 sirenomelia 351
 twin-twin transfusion syndrome 426
 umbilical cord coiling 484
 omphalocele 13, 267, 301, 302, 303, 305
 body stalk anomaly differential diagnosis 304
 chromosomal abnormalities 371
 3-D ultrasound 525
 detection 45, 47, 208
 ruptured 304
 omphaloenteric duct *see* vitelline duct
 orbit 83, 89
 anomalies 234–235, 238–239
 diameter 143, 152–153, 598
 organogenesis 60
 completion 18–19, 23
 organotropism 204–205
 ossification 61, 65
 centers 90, 91, 92
 femur 132, 134, 135
 tibia 132, 134
 3-D ultrasound 518, 526
 enchondral 132
 membranous 132
 perichondral 132
 vertebrae 90
 osteochondrodysplasias 337, 338, 339–344, 345–347, 348–349
 classification 336
 3-D ultrasound 526
see also skeletal dysplasias
 osteogenesis imperfecta 337, 338
 hypophosphatasia differential diagnosis 340
 type II 343–344
 ovarian cyst 129, 330, 331–332
 percutaneous procedures 539, 540, 551, 552
see also adnexal mass
 ovarian pregnancy 41, 42
 ovarian torsion 330

ovarian tumors 77, 78
 ovum, blighted 33, 35, 67–68, 70, 464
 blood flow 459, 460, 461
 oxygen therapy, transmaternal 503, 510
 oxytocin stress level 475

P

packed red blood cell transfusion 377
 palate development 81
 Pallister–Hall syndrome 329
 pancreas
 annular 298
 biometry 144, 157
 embryology 122
 parental history 565
 parenteral nutrition, fetal growth restoration 176
 Parkes–Weber syndrome 359
 paroxysmal supraventricular tachycardia 293, 295
 parvovirus B19 infection 191, 193, 195, 376–377, 383
 cordocentesis 538
 diagnosis 377
 fetal hydrops 375, 381, 383
 hepatomegaly 382
 intraperitoneal calcifications 382
 management 377
 prognosis 377
 Patau syndrome *see* trisomy 13
 pelvic floor, maternal 443
 pelvic inlet, transverse diameter 56
 pelvimetry 55–56, 58
 pelvis
 abdominal ultrasound 126, 128
 biometry 144–145, 156–158
 broadening 366, 369
 chromosomal abnormalities 366, 368, 369
 ultrasound anatomy 126, 128
 Pena–Shokeir syndrome 241, 354, 355
 penis 129, 130
 pentalogy of Cantrell 264, 267
 omphalocele 303
 percutaneous procedures in fetus 539, 540, 549, 550, 551, 552
 shunt procedures 551, 552
 pericardial effusion
 chromosomal abnormalities 366, 367
 Coxsackie infection 378
 nonimmune hydrops 196
 pericardium 111
 perichondral ossification 132
 peripheral blood vessels 493, 496
 peritoneal cyst 129
 periventricular lines 82, 84
 peromelia 336, 349, 350, 351, 352
 peroneal artery 105
 pes equinovarus *see* foot, club
 phalanges 133, 136
 pharyngeal diameter 96
 pharynx 93, 95
 biometry 94, 96
 embryology 93
 phocomelia 349, 350, 351
 Pierre Robin syndrome
 micrognathia 237

microphthalmos 235
 piriform recesses 93, 95
 placenta
 abnormalities 393, 395–396, 397, 398–400, 401–402
 structure 12
 thickness 13
 abruptio 397, 400, 401
 accreta 397, 398
 area 397
 arteriovenous anastomoses 501
 biometry 389, 391
 abnormal 393, 396, 397, 398
 biopsy 534, 535
 bipartite 393, 395
 bleeding following amniocentesis 531, 532
 calcification 389
 chorioangioma 193, 400, 401
 chromosomal abnormalities 369
 circulation 388
 circumvallate 393, 395
 cotyledons 388
 decidua plate 390
 definitive 458
 development 60, 388–389, 390
 diameter 389
 dichorionic 420, 422
 early 461
 end-diastolic flow, absent/reverse 510
 fetal anomalies 208, 211
 fetal part 388
 fused 416
 grades 389, 391–392
 hematomas 397, 398–399
 abruptio 400, 401
 increta 397, 398
 infarction 400, 401
 intrauterine fetal death 200
 localization 50, 54, 471, 472
 location 13, 389, 390
 abnormalities 393, 395–396
 cordocentesis 537
 low-lying 393, 395
 maternal part 388
 maturation 389, 391–392, 393
 metastases 401
 monochorionic 420, 422
 morphology 388, 390
 nonimmune hydrops 193
 pathology 471
 perfusion 393, 394, 397, 398
 Po₂ levels 459
 polyps 51, 54
 precreta 397, 398
 prenatal screening 12–13
 retained 443, 445
 shape 393, 395
 small 393, 396
 structural changes 13
 structure 389, 391–392, 393
 succenturiate 393, 395
 teratoma 401
 terminal villi 508
 thick 393, 396
 thickness 389, 391
 thin 393, 398

- placenta
 third screening 13
 tripartite 393, 395
 tumors 400, 401
 vacuolated 369, 393, 396
 vascular anastomoses 424, 426
 venous blood exit 469, 470
 placenta previa 13
 central 13
 complete 393, 396
 low-lying 13
 marginal 13, 393, 395
 partial 393, 396
 placental localization 50, 54
 placental hydrops 393, 396
 placental insufficiency 13
 growth discordance 424, 425
 high-risk pregnancy 507
 hyperechoic bowel structure 367
 IUGR 176, 180, 497, 500, 501
 oligohydramnios 411, 413
 placentation
 uterine blood flow changes 461–462, 463
 uteroplacental circulation 469
 placentocentesis, high-risk pregnancy 14
 placentomegaly 393, 396
 placentones 389, 393, 394
 plantar artery, medial 105
 platelet count 538
 pleural effusion
 hydrothorax 262
 nonimmune hydrops 195, 196
 percutaneous drainage 549, 550
 pulmonary hypoplasia 261
 shunt procedures 551
 thoracentesis 539, 540
 pleuroperitoneal duct closure 263
 polycystic kidney disease
 autosomal-dominant 316, 317
 autosomal-recessive 315, 316, 317
 polydactyly 339, 351, 352, 353
 associations 369
 3-D ultrasound 518, 525
 differential diagnosis 339
 Ellis-van Creveld syndrome 347, 348
 heptadactyly 338, 353
see also short rib-polydactyly syndrome
 polyhydramnios 11, 410, 413
 anal atresia 300
 arthrogryposis multiplex congenita 353, 354, 355
 causes 410
 CCAM 262, 266
 cervical teratoma 247
 chylothorax 262
 decompression amniocentesis 553, 555
 duodenal atresia 298
 esophageal atresia 248, 297
 fetal anomalies 207, 211
 fetofetal transfusion syndrome 501
 intrauterine laser treatment 551, 554
 Klippel-Trenaunay-Weber syndrome 359
 macrosomia in maternal diabetes 178
 medical treatment 555
 Pena-Shokeir syndrome 355
 placental chorioangioma 400, 401
 sacrococcygeal teratoma 333
 treatment 410
 twin-twin transfusion syndrome 426
 polynomials, high-order 140
 polysplenia syndrome *see* isomerism
 porencephaly 220, 229
 arachnoid cyst differential diagnosis 221
 portal vein 100, 102
 posterior fossa cyst, chromosomal abnormalities 364, 365, 367
 Potter syndrome 11, 207, 208
 amnioinfusion 540, 541
 anhydramnios 411, 413
 classic 314–315, 316
 oligohydramnios 413
 type II 316, 317–318
 type IIA 493
 type IV 318, 320
 power color Doppler 455, 456
 amplitude analysis 455, 456
 echocardiography 120, 121
 ventricular septal defects 281
 Prader-Willi syndrome 568
 preeclampsia 473–475
 aspirin therapy 474–475
 nonimmune hydrops 193
 pregnancy
 complications and nonimmune hydrops 193
 corpus luteum 61, 64, 65
 counseling 564
 dating accuracy 10
 detection by abdominal ultrasound 60–61, 63–64
 early
 abnormalities 10, 32–43
 diagnostic approach 32
 hemodynamic evaluation 458–466
 normal 17–19, 20–25
 ultrasound parameters 32
 early loss 464–465, 466
 ectopic 36
 first trimester
 abnormalities 67–68, 69–72, 73–74, 75–77, 78, 79
 biometry 61–62, 66
 crown-rump length 62, 66
 development 61, 64–65
 developmental milestones 19
 gestational age assignment 61–62, 66
 high-risk
 Doppler ultrasound 507
 IUD in place 36
 surveillance 507
 targeted imaging 14
 vascular surveillance 481, 482
 hypertensive disorders 476
 interstitial 38, 42, 74
 intrauterine 73, 76
 IUD in place 36, 37, 68, 70–71
 late and transvaginal ultrasound 2
 nonviable 531
 pain 438–439, 441
 prolonged 503
 singleton 27, 29, 31
 subsequent to intrauterine death 202
 symphyseal distension 439, 442
 termination
- arthrogryposis multiplex congenita 355
 chondrodysplasia punctata 341
 conjoined twins 432
 ethics 573
 fetal indication 574
 omphalocele 303
 Pena-Shokeir syndrome 355
 short rib-polydactyly syndrome 343
 tubal 38, 40
 ultrasound dating 161, 162
see also ectopic pregnancy; multiple pregnancy; twin pregnancy
 pregnancy-associated plasma protein-A (PAPP-A) 11
 pregnant woman, autonomy 572–573
 premature labor
 cerebral hemorrhage 491
 intrauterine death of one twin 427
 placental chorioangioma 400, 401
 premature rupture of the membranes 411, 413
 prematurity 163
 duodenal atresia 298
 multiple pregnancies 416
 prenatal care
 gestational age estimation 161
 rhesus incompatibility 186–187
 ultrasound screening 8–14, 16
 examiner proficiency 8
 fetal anomalies 8–9
 first 9–11, 16
 second 11–13
 third 13–14
 timing 8
 prenatal diagnosis, ethics 575
 prenatal diagnosis, invasive 530–541
 amniocentesis 530–531, 532, 533
 amnioinfusion 540, 541
 chorionic villus sampling 532, 533–534, 535
 cordocentesis 535, 536–539
 counseling 530
 early 533
 fetoscopy 539, 540, 541
 percutaneous 539, 540
 placental biopsy 534, 535
 procedures 530
 preterm induction for rhesus incompatibility 186
 proboscis 235, 239
 pronephros 312
 propranolol 546
 propylthiouracil fetal therapy 546
 prostacyclin 490
 prostaglandin I₂ 473, 474
 prostaglandin synthesis inhibitors 190, 193
 protein, oral maternal 176
 prune belly syndrome 129, 208, 319, 320
 3-D ultrasound 525
 prognosis 322
 pseudoascites 122, 124, 194
 pseudogestational sac 73–74, 75
 pseudomicrocephaly 224
 puerperium
 abdominal ultrasound 443, 444–445
 complications 443, 445
 x-ray pelvimetry 55
 pulmonary arteries, Doppler flow measurement 114, 115, 491, 492, 494

pulmonary atresia 274, 275
 pulmonary stenosis differential diagnosis 277
 pulmonary diseases, nonimmune hydrops 192, 196, 197
 pulmonary Doppler ultrasound 94, 96
 pulmonary function test, fetal 94
 pulmonary hypoplasia 113, 261, 264
 CCAM 262
 diaphragmatic hernia 263
 lung measurement 143
 Pena-Shokeir syndrome 354, 355
 short rib-polydactyly syndrome 343
 thoracometry 143
 pulmonary sequestration 263, 266
 CCAM differential diagnosis 262, 266
 pulmonary stenosis 276, 277
 tetralogy of Fallot 283, 284
 pulmonary trunk 100, 103, 107, 110, 112
 color Doppler 112, 117
 course 117, 118
 diameter 144, 155, 595
 origin 108, 110, 112, 118
 vascular caliber 112
 pulmonary valve 113
 pulmonary valvular stenosis 491
 pulmonary veins 111
 Doppler flow measurement 114, 115, 116, 117, 491, 494
 pulmonary venous return, total/partial anomalous 289–290, 291
 pulsatility index 114, 448, 449
 cerebral arteries 489, 490
 descending aorta 487, 488
 ductus arteriosus 491
 intracranial vessels 462
 renal artery 493, 494
 trophoblastic disease 465
 umbilical artery 485
 uterine waveform 471
 pulse repetition frequency 449, 451
 pulsed Doppler 449, 450
 cerebral blood flow 488
 guidelines 562
 intensity 561
 risk assessment 561
 uterine artery 462
 pyelectasis 321
 pyrimethamine 376
 fetal therapy 546, 548

Q

quiescent phases 168

R

rachischisis 253, 255, 259
 3-D ultrasound 524
 radial alveolar count (RAC) 261
 radial artery 104
 radiation embryopathy 206–207
 radiation injuries/exposure 207
 radius 132–133, 135
 aplasia 351, 352

RADIUS study 9
 rectal atresia 321
 renal agenesis
 bilateral
 anhydramnios 313
see also Potter syndrome
 chromosomal abnormalities 371
 renal vessel imaging 493
 unilateral 314, 315
 renal aplasia 314–315, 316
 renal artery, Doppler ultrasound 493, 494, 615
 renal circumference 144
 renal diameter 144
 renal dysplasia, percutaneous procedures 539, 540
 renal pelvic dilatation, fetal 312, 313, 320, 321
 chromosomal abnormalities 366, 367
 renal pelvic dilatation, maternal 438–439, 441
 renal pelvis
 expansion 126, 127
 obstruction 549, 552
 renal vessels 102, 104
 renal volume, weight estimation 164
 resistance index 448–449
 cerebral arteries 489, 490
 descending aorta 487, 488
 prolonged pregnancy 503
 renal artery 493, 494
 trophoblastic disease 465
 umbilical artery 481, 485
 uterine Doppler ultrasound 471
 uterine waveform 471
 respiratory excursions
 fetal 97, 99, 453, 454
 maternal 454
 respiratory tract
 embryology 93
 obstruction and nonimmune hydrops 192
 retrochorionic hematoma 466
 retrognathia 237–238, 241
 differential diagnosis 339
 retroplacental hematoma 393, 397, 398–399, 400
 rhabdomyoma 190
 cardiac 290, 291
 rhesus incompatibility 184, 501, 502, 503
 compensatory mechanisms 184
 delivery 187
 diagnosis 185–186
 exchange transfusion 186–187
 immune fetal hydrops 184–187
 intra-abdominal transfusion 549
 postpartum management 187
 prenatal management 186–187
 prognosis 186
 recurrence risk 186
 transfusion intervals 187
 rhesus prophylaxis 186, 208
 amniocentesis 531
 cordocentesis 537
 rhizomelia 337, 338
 differential diagnosis 339
 rhombencephalon 18, 22, 23
 ribs
 length 145, 159, 599
 ossification defect 526
see also short rib-polydactyly syndrome

right to life 573–574
 risk assessment 560–561
 Roberts syndrome 213
 clitoral hypertrophy 330
 cystic hygroma 246
 tetraphocomelia 351
 Routine Antenatal Diagnostic Imaging Ultrasound Study (RADIUS) 9
 rubella 379–380
 cordocentesis 537
 embryopathy 382, 384, 565
 growth retardation 381
 hepatomegaly 382
 intraperitoneal calcifications 382
 microcephaly 380, 382

S

S/D (systole/diastole) ratio 448
 sacrococcygeal teratoma 255, 260, 320, 333–334, 335
 Doppler ultrasound 501
 laser treatment 554
 and lipoma 255, 260
 malignant transformation 334
 surgery 334, 335, 554
 safety indices 561–562
 safety of diagnostic ultrasound 560–563
 sandal gap 368
 scale calibration 139
 scanner, real-time 2
 scapula 97, 98
 Schillinger formula for weight estimation 165
 scoliosis 339
 3-D ultrasound 526
 scrotum 129, 130
 edema 196
 Seckel syndrome 180
 auricular dysplasia 238
 semilunar valve 114, 115
 septoauricular continuity 112
 sex identification 129
 Shepard formula for weight estimation 164
 short rib-polydactyly syndrome 145, 192, 342, 346
 forms 342
 heptadactyly 338
 humerus 338
 micropenis 329, 331
 shoulder dystocia 163
 shunt procedures 551, 552
 sickle-cell anemia 538
 sinus arrhythmias 292
 sinus bradycardia 292
 sinus tachycardia 293
 fetal therapy 546
 sirenomelia 351, 352
 situs inversus 286, 288, 289, 291, 301, 302
 Sjögren-Larsson syndrome 360
 Sjögren's syndrome 193
 skeletal dysplasias 337, 338, 339–344, 345–347, 348–349
 classification 336
 3-D ultrasound 518, 525
 fatal 337, 339–341

skeletal dysplasias 337, 338, 339–344, 345–347, 348–349
 frequency 337, 338
 intrauterine surgery 555
 nonfatal 344, 347, 348–349
 nonimmune hydrops 192
 pulmonary hypoplasia 261
 rib length 145
 ultrasound differentiation 337
 vertebral bodies 145
 skeleton, biometry 598–600
 skin
 amniotic fluid regulation 409
 anomalies 359–360, 361
 bullous changes 360, 361
 disorders 359–360, 361
 edema 359, 361
 fetal hydrops 195, 359
 hereditary disease 539
 hyperechoic focal changes 360, 361
 hyperkeratotic disorders 360, 361
 tumors 359, 361
 skull
 cloverleaf 224, 232, 339
 thanatophoric dysplasia 341, 346
 deformable 339
 embryology 81, 83
 fetal 61, 65
 frontal bossing in thanatophoric dysplasia 342, 345
 shape abnormalities 223–225, 232–233
 differential diagnosis 339
 strawberry-shaped 225, 233, 368
 see also superior bones
 small bowel loops 144
 small for gestational age (SGA) 163
 see also intrauterine growth retardation
 Smith–Lemli–Opitz syndrome
 auricular dysplasia 238
 micrognathia 237
 sodium, obstructive uropathy levels 322, 323
 Sotos syndrome 177
 Spalding's sign 200, 201
 spectral Doppler echocardiography 113–114, 115, 116
 aliasing 113, 116, 450, 451
 aortic stenosis 278, 279
 coarctation of aorta 280
 DORV 285
 hypoplastic left heart syndrome 277, 279
 pulmonary atresia 274, 275
 pulmonary stenosis 277
 tetralogy of Fallot 284
 transposition of the great arteries 285, 286, 287
 tricuspid atresia 273, 274
 tricuspid dysplasia 275
 truncus arteriosus 286
 ventricular septal defects 281, 282
 spina bifida 253–256, 257–260
 aperta 253, 258
 chromosomal abnormalities 370
 club foot association 353
 complete 253
 cystica 253, 259
 diagnosis 255, 259, 260

head growth retardation 177
 high 12
 intrauterine surgery 554
 lemon sign 211
 management 256
 occulta 253, 257
 partial 253
 prognosis 255–256
 spinal column 90, 91–92
 embryology 90, 91
 fetal 61, 65
 ultrasound anatomy 90, 91–92
 spinal cord, unequal growth with spinal column 90, 91
 spine, angulation 200, 201
 spina bifida 255, 259
 spiral arteries 389, 393, 394
 after placentation 461
 changes 458
 intrauterine growth retardation 473
 opening 458
 trophoblast invasion 462
 trophoblastic plugs 461
 waveform changes 462
 spiramycin 376
 fetal therapy 546, 548
 spleen
 biometry 144, 156, 157, 596
 embryology 122
 growth curves 144, 156
 ultrasound anatomy 122, 124
 splenomegaly 144, 307
 see also hepatosplenomegaly
 startles 168, 169
 STIC (spatial–temporal image correlation) technique 519, 520, 527
 stomach
 biometry 144, 157
 development 19, 25
 growth curves 144
 situs inversus 301, 302
 small 297
 ultrasound anatomy 122, 124
 stroke volume 143
 stuck twin 425, 426, 501
 subamniotic hematoma 397, 399
 subchorionic cystic space 389, 392
 subchorionic hematoma 464, 466
 sucking movements 169
 sulfadiazine 376
 sulfamethoxydiazine fetal therapy 546, 548
 superior vena cava 112
 persistent left 112, 290, 291
 supraventricular extrasystoles 453, 455, 501, 502
 supraventricular tachycardia 501, 502
 fetal therapy 546, 548, 550
 paroxysmal 293, 295
 surgery, fetal 553, 554–555
 swallowing 94
 amniotic fluid regulation 409
 esophageal atresia 248
 movements 169
 symmelia 351, 352
 symphyseal distension, maternal 439, 442
 syndactyly 339, 353, 354

synophthalmia 235, 239
 syphilis 379
 hepatomegaly 382
 intraperitoneal calcifications 382
 nonimmune hydrops 191
 systemic lupus erythematosus (SLE)
 complete congenital heart block 293
 nonimmune hydrops 193
 systolic blood flow, ductus arteriosus 491

T

T sign 420, 422
 tachyarrhythmias 293, 295
 fetal therapy 546, 547–548
 management 294
 nonimmune hydrops 190, 193, 197
 telencephalon 18, 22, 23
 development 18, 24
 embryology 81
 teratogenic insult 204
 teratogens 206
 exencephaly 212
 teratologic determination period 204
 teratomas
 cardiac 290, 291
 cephalocele differential diagnosis 213
 cervical 247, 251
 classification 333
 congenital 237
 etiology 333
 intrathoracic 262
 malignant transformation 333
 nonhomogenous echo structure 333, 335
 nonimmune hydrops 193
 pathogenesis 333
 placental 401
 umbilical cord 405
 see also sacrococcygeal teratoma
 testes 129, 130
 testicular hydrocele 329, 331
 tetralogy of Fallot 283, 284
 extreme 275
 rubella 382
 tetrasomy 9, partial 240
 α-thalassemia 191
 β-thalassemia 538
 thalidomide 336
 embryopathy 349, 565
 exposure timing 565, 569
 thanatophoric dysplasia 224, 337, 341, 345–346
 frontal bossing 338
 theca lutein cysts 68
 thermal index 561–562
 thoracentesis 539, 540
 thoracic anomalies 261–264, 265–267
 hypoplasia 343
 thoracic circumference, bony 594
 thoracic diameter
 sagittal 261, 594
 transverse 261
 bony 594
 thoracic diseases, nonimmune hydrops 192, 196, 197
 thoracoamniotic shunt 262, 551

thoracocentesis, before delivery 262
 thoracometry 143, 154
 thoracopagus 45, 47, 429, 431
 thorax 97, 98–99
 biometry 143–144, 154–155, 594–595
 chromosomal abnormalities 370–371
 growth curves 143, 154
 narrow 338, 344, 346
 Ellis–van Creveld syndrome 347, 348
 Pena–Shokeir syndrome 354, 355
 thrombocytopenias 538, 548–549
 thromboxane A₂ 473, 474, 490
 thumb, radial aplasia 351, 352
 thyroglossal duct cyst 248
 thyroid gland biometry 143, 153, 593
 thyroiditis, autoimmune maternal 545
 L-thyroxine fetal therapy 546
 tibia 132, 134
 fracture 338
 ossification centers 132, 134
 tibial artery 105
 vascular resistance 493, 496
 tidal volumes 94
 tissue Doppler echocardiography 455, 456
 tissue heating 560, 561–562
 pulsed Doppler 561
 tocolytic therapy 190, 193
 toes, amputation in amniotic band syndrome 401
 tone, fetal 171
 tongue 83, 86
 tooth buds 82
 TORCH infections 301, 375
 hepatic calcifications 307
 intrauterine fetal death 381
 toxoplasmosis 376
 cordocentesis 537–538
 fetal therapy 546, 548
 hepatomegaly 382
 intraperitoneal calcifications 382
 malformations 206
 nonimmune hydrops 191
 ventriculomegaly 384
 trachea 93, 95
 biometry 94, 96
 diameter 96
 embryology 93
 tracheal cartilages 93, 95
 transducers, heart imaging 106
 transplacental therapy, intrauterine 376
 transvaginal fetal echocardiography 462
 transvaginal pelvimetry 55–56, 58
 transvaginal ultrasound 2–3, 5
 applications 2
 color Doppler 458
 3-D ultrasound 45–46, 516–519
 early pregnancy abnormalities 32
 echocardiography 118, 119, 120
 examination 3
 fetal anomalies 45–46, 47–48
 first trimester 2
 image orientation 3, 5
 maternal disorders 49–51, 52–54
 pelvimetry 55–56, 58
 scan planes 5
 scanning sequence 3
 technique 17

transducer 3, 5
 uteroplacental vessels 471
 transverse lie
 dorsoinferior 4
 dorsosuperior 4, 7
 TRAP sequence 192, 428, 430
 Treacher–Collins syndrome
 auricular dysplasia 238
 micrognathia 237
 microphthalmos 234
Treponema pallidum 206, 379
 tricuspid valve 111
 atresia 273, 274, 275
 dysplasia 274, 275, 276, 277
 incompetency 501
 insufficiency 273
 triple test 10
 triploidy 12
 chromosomal abnormalities 371
 early growth retardation 364
 nuchal translucency 45
 placenta abnormality 211
 vacuolation 369
 posterior fossa cyst 365
 proportional IUGR 176
 spina bifida 370
 suggestive signs 372
 trisomy
 anembryonic abortion 33
 nuchal translucency 45, 78, 82, 363
 trisomy 13
 cisterna magna widening 142
 corpus callosum agenesis 370
 early growth retardation 364
 holoprosencephaly 219, 370
 microcephaly 370
 microphthalmos 235, 239
 nonimmune hydrops 190
 posterior fossa cyst 364
 proportional IUGR 176
 renal anomalies 318
 renal pelvic dilatation 313
 spina bifida 370
 suggestive signs 372
 trisomy 18
 auricular dysplasia 238, 241
 camptodactyly 353
 cisterna magna widening 142
 cleft lip/palate 240
 clinodactyly 354
 clitoral hypertrophy 330
 club foot association 353
 corpus callosum agenesis 370
 early growth retardation 364
 esophageal atresia 297
 holoprosencephaly 370
 micrognathia 237, 241
 nonimmune hydrops 190
 nuchal translucency 363
 phenotypic expression 368, 371, 372
 posterior fossa cyst 364
 proportional IUGR 176, 182
 renal anomalies 318
 rocker-bottom foot 353, 354
 spina bifida 255, 370
 suggestive signs 372
 trisomy 21 211, 371
 fetal hydrops 364
 golfball phenomenon 367
 hand deformities 368
 Hirschsprung disease 300
 hyperechoic bowel 300, 302
 macroglossia 237, 241
 nonimmune hydrops 190, 195
 nuchal fold
 size 142
 thickening 225, 233
 nuchal translucency 45, 363
 pelvis broadening 366, 369
 pericardial effusion 366, 367
 phenotypic expression 371, 372
 proportional IUGR 176
 renal pelvic dilatation 367
 sandal gap 368
 twin pregnancy 427, 430
 unfused amniotic bands 400
 trophoblast invasion, impaired 473, 477
 trophoblastic cells 458
 trophoblastic diseases 465, 466
 trophoblastic layers 533
 trophoblastic plugs 459, 461
 truncus arteriosus 286, 288
 trunk
 campomelic syndrome 343
 development 18–19, 24
 tubal pregnancy 38, 40
 see also fallopian tube
 Turner syndrome
 cystic hygroma 246, 364, 365
 fetal hydrops 364
 hydrothorax 265
 nonimmune hydrops 190
 nuchal translucency 363
 suggestive signs 372
 twin pregnancy
 amniocentesis 532, 533
 amnioticity 416, 417, 423, 424
 autosite 432
 chorionicity 416, 417, 418, 423, 424
 conjoined 418, 429, 430, 431, 432
 detection 10, 16
 dichorionic diamniotic 418, 420, 422, 432
 dizygotic 416, 417, 422–423, 427, 428, 430
 dye instillation 533
 false-positive diagnosis 418, 419, 422
 fetal anomalies 427, 428–429, 430, 431, 432
 fetofetal vascular anastomoses 417, 418
 frequency 416
 genetic predisposition 416
 growth discordance 13, 423, 424, 425
 intrauterine fetal death 202
 one twin 201, 202, 427
 management 432–433
 maternal age 416
 monochorionic 418, 420–421, 422, 423, 427
 diamniotic 432–433
 monochorionicity 426
 monozygotic 416, 417, 418, 422–423, 428–429, 430, 431, 432
 nonimmune hydrops 192
 parasitic 428, 430, 432, 432

twin pregnancy
rate 416
zygosity 424
twins
birth weight 612
blighted 423
conjoined 45, 47
dead second 201
stuck 425, 426, 501
vanishing 416
twin-twin transfusion syndrome 416, 417, 418, 423, 424, 425, 426–427
abdominal ultrasound 190, 191, 192, 195
diagnosis 426, 428
donor twin 426
fetal circulation 501, 502
fetoscopy 539
growth discordance 424, 426
intrauterine death of one twin 201, 427
laser treatment 551, 552
monochorionicity 426
nuchal translucency 364
recipient twin 426
serial amniocentesis 555
TRAP sequence 428, 430
treatment 426–427

U

ulna 132–133, 135
ulnar artery 104
umbilical arteries 100, 102, 105, 404, 406
cerebroplacental ratio 490
color Doppler 482
cordocentesis 537
diameter 601
Doppler ultrasound 481, 482, 483–484, 613
Doppler velocimetry 483, 485, 486
embryo 462, 463
end-diastolic flow 485, 501
abnormal 483, 485–486
absent 507, 508–511, 512
reference range 485
reverse 507, 508–511, 512
single 304, 404–405, 407, 484, 486
chromosomal abnormalities 368, 369, 404
compensatory dilatation 484
diagnosis 208, 211
waveform patterns
abnormalities 483, 485–486
gestational age 481, 482
umbilical cord
abnormalities 404–405, 407–408
absent 304, 306
anatomy 404, 406
biometry 404, 407, 601
chromosomal abnormalities 368, 369
coiling 405, 408, 484
compression 483, 486
cysts 368, 369, 405, 408
hemangioma 405
hematoma 405, 408
insertion 19, 25, 122, 125
variations 405, 408
knottting 405, 408

looping 202, 213, 215
nonimmune hydrops 193
occlusion 554
packed red blood cell transfusion 377
physiology 404
prenatal screening 12
short 304
teratoma 405
tumors 405
twin–twin transfusion syndrome 425, 426
umbilical artery Doppler spectrum 481, 483
vasa previa 405
umbilical hernia 301, 302, 303, 305
umbilical hernia, physiologic 10, 18–19, 22–23, 24
detection 27, 61, 64
embryology 122, 123
omphalocele differential diagnosis 302, 303
umbilical vein 100, 101, 102, 404, 406
color Doppler 482
cordocentesis 535, 537
diameter 601
Doppler ultrasound 495, 496, 497, 498, 500
persistent right 405, 407
thrombosis 405
umbilicocerebral ratio 615
urachal cyst 319, 321
ureter
dilated 321
subpelvic obstruction 319
ureteral bud 312, 313
ureterocele 319
urethra, obstruction 319
urethral valve 320
urinalysis
obstructive uropathy 322, 323, 539
renal dysplasia 539
urinary ascites 192, 194, 195, 196
urinary bladder, fetal
biometry 144–145, 158
development 19, 24, 25
dilated 321
embryology 126, 319
emptying 145
exstrophy 312, 313, 321
nonvisualization in Potter syndrome 314
ultrasound anatomy 126, 127–128
volume 145, 158
urinary bladder dysfunction, maternal 443
urinary tract
abdominal ultrasound 126, 127–128
anomalies 312–326
obstructive 319, 320, 321–322, 323–324, 325
outflow obstruction 319
urine
fetal production 409
twin–twin transfusion syndrome 426
hourly production rate 145
production 169
urogenital system
biometrics 597
chromosomal abnormalities 371
uropathy, obstructive 319, 320, 321–322, 323–324, 325
management 322, 324
percutaneous drainage 549, 552
percutaneous procedures 539, 540

prenatal management 322
shunt procedures 551, 552
uterine artery, maternal
Doppler ultrasound 469, 470, 471, 476, 477, 613
screening 476
end-diastolic blood flow velocity 475, 477
pulsed Doppler 462
waveform
maternal serum AFP levels 475
medication effects 475–476
uterine contractions 475, 477
uterine fibroids, maternal 49, 52
detection in early pregnancy 77, 78, 79
uteroplacental circulation 458, 459, 460, 461, 469–477
abnormal waveforms 471
development 469, 470
Doppler ultrasound 469, 470, 471
exchange processes 469, 470
transvaginal ultrasound 471
uterus, maternal
angulation 443, 444
anomalies
placenta location 393, 396
twin pregnancy mimicking 418, 419
bicornuate 38, 42
bleeding 2
blood flow changes after placentation 461–462, 463
contractions 475, 477
local 78, 79
Doppler ultrasound clinical significance 471, 473–476, 477
involution 443, 444
leiomyoma 438, 440
length 443, 444
malignant tumors 49, 52
mass diagnosis 49, 52
postpartum 50–51, 54
retroflexed 2
rupture 38, 42
risk with cervical implantation 60
third screening 14
wall vascularity 393, 394

V

VACTERL syndrome 297, 299, 300
sirenomelia 351, 352
vaginal bleeding, maternal 32, 33
placenta previa investigation 50
vaginal transducers 2, 3
valproic acid 212
value system 572

velocity calibration 139
 venous Doppler 501
 ventricle
 diameter 595
 output 481
 right
 right ventricular outflow tract (RVOT) obstruction 275
 ventricular hypertrophy 283, 284
 ventricular output 481
 see also atrioventricular entries; cerebral ventricles; double-outlet right ventricle (DORV)
 ventricular septal defects (VSD) 112, 280–281, 282
 aortic arch anomalies 278
 DORV 285
 rubella 382
 tetralogy of Fallot 283, 284
 tricuspid atresia 273, 274
 ventricular septum 109, 111
 ventriculoarterial concordance 107, 112
 ventriculocoronary fistula 275
 verapamil 546, 547
 vernix caseosa 409, 411
 vertebrae, ossification 90
 vertebral arch 90, 92
 vertebral body 90, 92
 biometry 145, 158, 159, 599
 deficient ossification 339
 vesicoamniotic shunts 322, 324
 vesicocutaneous fistula 321
 vesicourethral reflux 319
 viral infections
 meconium ileus differential diagnosis 300
 proportional IUGR 176
 viscerocardiac situs 107
 viscerocranium 81
 vitelline duct 26
 blood flow 460, 461
 von Willebrand–Jürgens syndrome 538

W

Weaver syndrome 177
 weight, fetal
 estimation 163–165, 166, 603–610
 formulas 164
 low-weight infants 164, 610
 normal-weight infants 164
 phases of gain 163
 Wiedemann–Beckwith syndrome 177
 Wilms tumor 324, 325
 wolffian (mesonephric) duct 129

Y

yawning, fetal 83, 86
 yolk sac 19, 24, 26–27, 29
 abnormal 33, 34
 biometry 579
 blood flow 460, 461, 463
 detection 26, 61, 64, 65
 gestational age 579
 growth pattern 26, 30
 separation 18, 20–21
 size/shape discrepancies 26–27