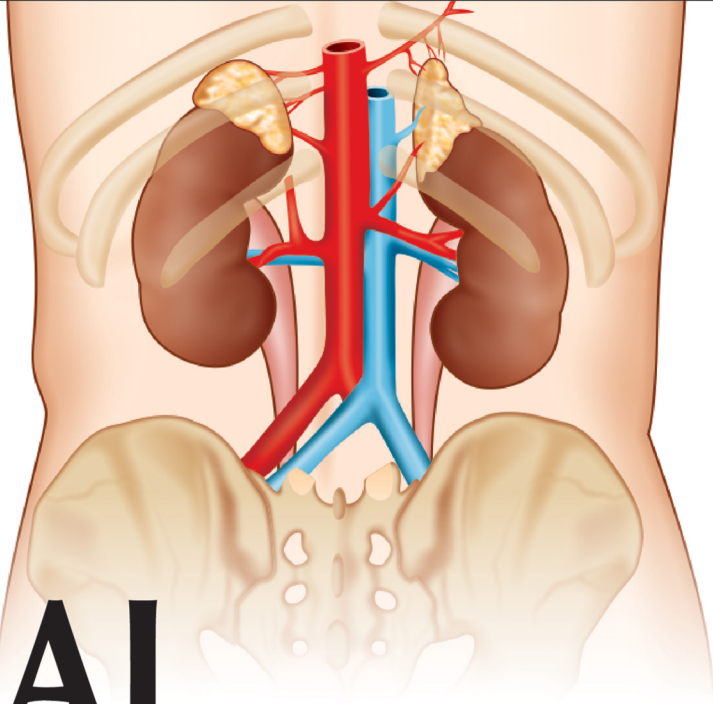
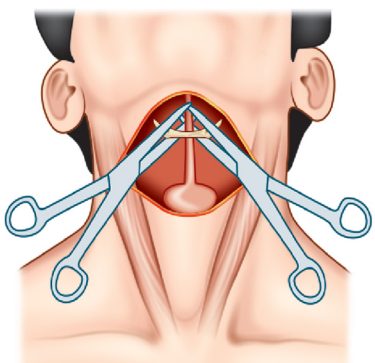
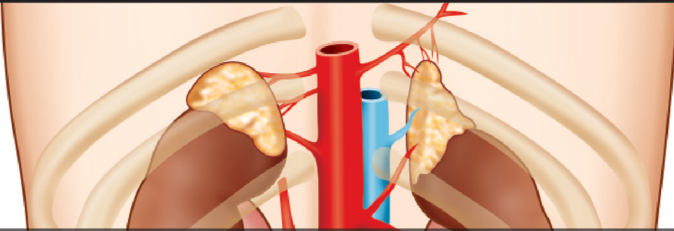
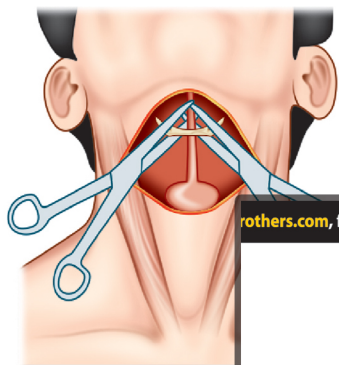




SRB
SU
OP
Text

SRB's **SURGICAL** **OPERATIONS** Text and Atlas

3rd
Edition

Volume

- Introduction and Pre
- Preoperative Prepar
- Basic Principles of
- Day Care Surgery, A
- Instruments
- Energy Sources in S
- Basic Surgical Proc
- Principles of Surgic
- Principles of Surgic
- Amputations

Volume 2

- Surgery of Oesophagus
- Surgery of Stomach and Duodenum
- Surgeries of Small Bowel and Appendix
- Surgeries of Liver and Biliary System
- Surgeries of Pancreas and Spleen
- Colonic Surgeries
- Anorectal Surgeries
- Retroperitoneal Surgeries
- Urologic Surgeries
- Adrenal Gland Surgeries
- Surgeries of Penis, Scrotum and Testis
- Obesity and Morbid Obesity
- Basic Surgeries in Obstetrics and Gynaecology
- Other Procedures

Sriram

Sriram Bhat M

Forewords
K Ganesh Pai
Ashok Pandit



Contents

VOLUME

1

Chapter 1. Introduction and Principles in Operative Surgery1

- Position of the Surgeon 1
- History of Surgery 2
- Ethics in Surgery 7

Chapter 2. Preoperative Preparation, Operation Room and Postoperative Care.....9

- Preoperative Assessment 9
- Operative Risk Assessment 11
- Disinfection and Sterilisation 11
- Methods of Sterilisation and Disinfection 12
- Gaseous Sterilisation 20
- Operation Theatre Room (Operation Theatre Complex) 23
- Postoperative Care 35
- Surgical Complications 37

Chapter 3. Basic Principles of Incision, Dissection, Suturing and Haemostasis.....53

- Principles of Incision 53
- Dissection 59
- Suturing Technique 62
- Knot Tying Technique 74
- Suture Removal 85
- Haemostasis 85

Chapter 4. Day Care Surgery, Ambulatory Surgery and Outpatient Surgery.....94

- Technique 95

Chapter 5. Instruments.....97

- Cheatle's Forceps 97
- Sponge Holding Forceps (Rampley's) 97
- Mayo's Towel Clip 98
- Backhaus' Towel Clip 99
- Moynihan's Tetra Towel Clip/Forceps 99
- Doyen's Towel Clip 99
- Artery Forceps (Haemostat) 100

- Negus Artery Forceps 101
- Right Angle Forceps—Meister's/Lahey's/Mixer's 101
- Wells' Arterial Clamp 102
- Bulldog Clamp 102
- Satinsky Vascular Clamp 103
- De Bakey's Vascular Clamp 103
- Pedicle Clamps 103
- Kocher's Forceps 104
- Allis' Tissue Holding Forceps 104
- Babcock's Forceps 105
- Lane's Tissue Holding Forceps 105
- Marrant-Baker's Appendix Holding Forceps 105
- Moynihan's Tissue Forceps 106
- Kocher's Gland Holding Forceps 106
- Young's Gland Forceps 106
- Dissecting Forceps 106
- Kocher's Thyroid Dissector 107
- Sinus Forceps (Lister's) 108
- Russian Forceps 108

Retractors 108

- Single Hook Retractor 109
- Volkmann's Retractor/Cat's Paw 109
- Fisch Nerve Hook 110
- Skin Hook 110
- Langenbeck's Retractor 110
- Czerny's Retractor (Hernia Retractor) 110
- Right Angle Retractor 110
- Morris' Retractor 111
- 'C' Shaped Retractor—Roux 111
- 'S' Shaped Retractor 111
- Deaver's Retractor 111
- Keyland's Retractor 111
- Doyen's Retractor 112
- Balfour's Self-retaining Retractor 113
- Millin's Self-retaining Retractor 113
- ALM Retractor 113
- Finochietto Retractor (Rib Spreader) 114
- Joll's Thyroid Retractor 114
- Kocher's Thyroid Retractor 114
- Macintosh Depressor (Retractor) 114

- Mollison's Mastoid Retractor 114
- Bladder Neck Retractor 115
- Cheek Retractor 115
- Scapula Retractor 115
- Kidney Hilum Retractor 115
- Morris Kidney Retractor 115
- Allison's Lung Retractor 115
- Rib Retractor (Tuffier's) 115
- Doyen's Rib Raspatory 116
- Farabeuf's Raspatory 116
- Rib Shear 116
- Rib Approximator 117
- Bone Saw and Bone File 117
- Duval's Lung Holding Forceps 117
- Friedrich's Lung Holding Forceps 117
- Bickford's Bronchial Clamp 118
- Surgical Needles 118
- Needle Holder 122
- Bard-Parker's Handle (BP Handle) 123
- Surgical Blades 123
- Tenotomy Knife 124
- Aneurysm Needle 124
- Scissors 124

Bowel Occlusion Clamps 125

- Crushing Clamps 126
- Desjardin's Choledocholithotomy Forceps 127
- Bakes Dilator 128
- Cheatle's Gallstone Scoop with or without Hook 128
- Cholecystectomy Forceps 128
- Gallstone Probe 128
- Mayo-Robson's Cholecystoenterostomy Clamp 128
- Kehr's 'T'Tube 129
- Suction Instruments 129
- Tracheostomy Tube 130
- Tracheal Dilator (Trousseau's) 131
- Tracheal Hook 132
- Cricoid Hook 132
- Endotracheal Tube 132
- Direct Laryngoscope 133
- Magill's Forceps 133

Drains 134

- Intercostal Drainage Tube 136
- Paul's Drainage Tube 136

Catheters 136

- Foley's Catheter (Fredrick Eugene Basil Foley, American Urologist) 137
- Malecot's Catheter 138
- Simple Red Rubber Catheter 139
- Depezzier's Catheter 139
- Catheter Introducer 140
- Gibbon's Catheter 140
- Tiemann Catheter 140
- Metal Catheters 140
- Ureteric Catheter 141

Urethral Dilators 141

- Lister's Urethral Dilator 141
- Clutton's Dilator 142
- Filiform Bougies 142
- Bladder Sound 142
- Thompson-Walker's Suprapubic Cystolithotomy Forceps 142
- Boomerang Needle 143
- Nasogastric Tube/Ryle's Tube 143
- Infant Feeding Tube 143
- Flatus Tube 144
- Hernia Bistoury 144
- Collingwood Stewart's Ring-shaped Blade Hernia Forceps 144
- Polypropylene Mesh 145
- Trocar and Cannula 145
- Hernia Director 145
- Proctoscope (Kelly's) 145
- Saint Mark's Anal Dilator 146
- Fistula Bistoury 146
- Brodie's Fistula Director 146
- Pile Holding Forceps 146
- Yeoman's Punch Biopsy Forceps 146
- Moynihan's Glass Tube 147
- Dupuytren's Enterotome 147
- Spigot 147
- Hudson Brace with Perforator and Burr 147
- Suture Materials 147
- Mitchel's Clip Device 152
- Touhy Epidural Catheter 152
- Syringes 152
- Doyen's Mouth Gag 153
- Jennings Mouth Gag 154
- Tongue Depressor 154
- Airway 154
- Humby's Knife 154
- Myer's Vein Stripper 155
- Bone Cutting Forceps 156
- Bone Elevator/Bone Lever 156
- Bone Nibbler 156
- Sequestrectomy Forceps/Sequestrum Holding Forceps 157
- Fergusson's Bone Holding Forceps/Lion Forceps 157
- Chisel 157
- Osteotome 157
- Mallet 157
- Gigli's Saw 157
- Kidney Tray 158
- Gallie Cup 158
- Mayo's Table 158
- Volkmann's Scoop 158
- Fine Lengthy Straight and Bayonet Forceps 158
- Cystoscope 159
- Ambu Bag 159
- Laparoscopic Instruments 159

Chapter 6. Energy Sources in Surgery.....162

- Electrocautery and Electrosurgery 162
- Lasers in Surgery 168
- Argon Beam Coagulator 172
- Low and High Frequency Sound Wave Energy 172
- Cavitron Ultrasonic Surgical Aspirator (CUSA) 173
- Ligasure 174
- Radiofrequency Ablation 174
- Cryotherapy 174
- Microwave Ablation 175
- Radiosurgery 175
- Photodynamic Therapy 176
- Thunderbeat 176

Chapter 7. Basic Surgical Procedures.....178

- Urinary Catheterisation 178
- Insertion of a Nasogastric Tube 180
- Abscess Drainage 181
- Tracheostomy 188
- Circumcision 194
- Dorsal Slit of Prepuce 197
- Excision of the Swelling 197
- Lymph Node Biopsy 204
- Liver Biopsy 207
- Kidney Biopsy 208
- Bone Marrow Aspiration 208
- Lumbar Puncture 208
- Pleural Tap (Thoracocentesis) 210
- Pericardial Tap (Pericardiocentesis) 211
- Peritoneal Tap (Ascitic Tap) 211
- Intercostal Tube Drainage (ICT Drainage) 212
- Bronchoscopy 214
- Vasectomy 214
- Vasovasostomy (Recanalisation Procedure) 215
- Staplers in Surgery 215
- Graft 220
- Flaps 227
- Earlobe Repair 242
- Toe Nail Excision 243
- Dermabrasion 243
- Venepuncture 245
- Venesection 246
- Intraosseous Fluid Therapy 248
- Subcutaneous Infusions as Fluid Therapy 248
- Local/Regional Anaesthesia 248

Chapter 8. Principles of Surgical Management in Trauma.....250

- Assessment of Severity of the Injury 250
- Prehospital Trauma Care 251
- Tertiary Hospital Care 251
- Assessment of the Wound 252
- Wound Excision and Management 253
- Principles in Usage of Antibiotics 254
- Management of Foreign Body 254

- Triage 255
- Concepts in Trauma Management 255
- Damage Control Surgery 255
- Neck Injuries 256
- Thoracic Trauma 256
- Abdominal Trauma 259
- Liver Injury 263
- Splenic Injury 265
- Pancreatic Injury 268
- Duodenal Injuries 268
- Small Bowel Injury 270
- Large Bowel Injury 272
- Rectal Injuries 273
- Renal Injuries 274
- Abdominal Compartment Syndrome 276
- Urethral Injury 276
- Rupture Bladder 277

Chapter 9. Principles of Surgical Treatment in Infections279

- Principles 279
- Drainage of an Abscess 288

Chapter 10. Amputations300

- Indications 300
- Ideal Stump 301
- Complications of Amputations 301
- Principles in Amputation 303
- Different Amputations 304
- Upper Limb Amputations 314
- Hand Amputations 318
- Arm and Shoulder Amputations 320
- Rehabilitation 322
- Diabetic Foot and Diabetic Foot Surgery 326
- Surgical Offloading 326

Chapter 11. Surgeries in Arterial Diseases.....330

- Principles in Vascular Surgery 330
- Different Methods of Arterial Suturing 333
- Endarterectomy 336
- Carotid Endarterectomy 338
- Aortoiliac Thromboendarterectomy 339
- Arterial Substitutes 341
- Aortofemoral Bypass Graft 345
- Other Graft Procedures 352
- Aortoiliac Bypass Graft 353
- Iliofemoral Graft 353
- Femoropopliteal Bypass Graft 354
- Saphenous Vein Graft 355
- Axillofemoral Graft 362
- Femorofemoral Crossover Graft 362
- Distal Arterial Bypass 364
- Abdominal Aortic Aneurysm 365
- Endovascular Aneurysm Repair 370
- Complications of Revascularisation in Acutely Ischaemic Limb 372
- Acute Ischaemia 373

- Thoracoabdominal Aneurysm 375
- Renal Revascularisation 375
- Exposure of Carotid Artery 376
- Exposure of Vertebral Artery 378
- Exposure of Subclavian Artery 379
- Exposure of Axillary Artery 380
- Exposure of Brachial Artery 381
- Exposure of Radial and Ulnar Arteries 382
- Exposure of Ascending Aorta and Arch of the Aorta 383
- Exposure of Descending Thoracic Aorta 384
- Exposure of Abdominal Aorta and Branches 385
- Exposure of Iliac Arteries 386
- Exposure of Femoral Artery and Branches 387
- Arteriovenous Fistula for Haemodialysis (Haemodialysis Access) 389
- Peritoneal Dialysis Access 395
- Omentoplasty 395

Chapter 12. Surgery in Venous and Lymphatic Diseases402

- Venous Doppler 402
- Duplex Scan 402
- Surgical Anatomy of Lower Limb Veins 404
- Different Types of Perforators 405
- Physiology of Venous Blood Flow in Lower Limb 405
- Venous Pathology 406
- Management of Varicose Vein Disease 407
- Trendelenburg Operation (Saphenofemoral Crossectomy) and/or Stripping 407
- Ligation of Saphenopopliteal Junction and Stripping of Small Saphenous Vein 416
- Subfascial Ligation 417
- Ambulatory Selective Varices Ablation 417
- Endovenous Thermal Ablation 419
- Radiofrequency Ablation Method (VNUS Closure Method) 419
- Endovenous Laser Ablation/Treatment 421
- Heat Ablation for Closure of Incompetent Perforator Vein 426
- Trivex Method 426
- Other Methods 426
- Injection Sclerotherapy for Varicose Veins (Fegan's) 426
- Management of Venous Ulcer 430
- Compression Therapy for Varicose Veins 431
- Causes of Recurrent Varicose Veins 432
- Surgical Treatment for Deep Venous Thrombosis and Venous Thromboembolism 432
- Surgeries for Lymphoedema 435

Chapter 13. Surgeries of Nerves, Muscles and Tendons438

- Muscle Repair 438
- Muscle Debridement (Muscle Excision) 438

- Compartment Syndrome 438
- Tendon Repair 439
- Tendon Release 439
- Tendon Transfer 440
- Tendon Graft 440
- Tendon Lengthening 440
- Nerve Repairs 440
- Tinel's Sign 442
- Management of Nerve Entrapment/Compression (Nerve Release) 442
- Lumbar Sympathectomy 446
- Cervicothoracic Sympathectomy 449

Chapter 14. Surgeries of Face, Head and Neck454

- Surgical Anatomy of Neck 454
- Basic Principles in Head and Neck Surgery 456
- Head and Neck Trauma 457
- Retropharyngeal Abscess 458
- Parapharyngeal Abscess 459
- Treatment of Ludwig's Angina 459
- Treatment of Tuberculous Lymphadenitis and Cold Abscess in the Neck 459
- Excision of the Branchial Cyst and Fistula 461
- Pharyngeal Pouch 461
- Surgical Treatment of Cystic Hygroma 462
- Tongue Tie 465
- Surgical Management of Cervical Rib (Thoracic Outlet Syndrome) 465
- Carotid Body Tumour 467
- Biopsy in Head and Neck Diseases 469
- Cervical Lymph Node Biopsy 469
- Radical Neck Dissection 470
- Surgery of Head, Face and Jaw 478
- Surgery of the Eyelids/Orbit/Eyeball 479
- Surgery of the Ear 479
- Cleft Lip and Cleft Palate 480
- Surgeries of the Oral Cavity 481
- Surgery for Lip Lesions 498

Chapter 15. Surgery for Thyroid and Parathyroid506

- Surgical Anatomy of Thyroid 506
- Excision of Thyroglossal Cyst 511
- Thyroidectomy 512
- Complications of Thyroidectomy 526
- Parathyroid Surgery 532
- Parathyroid Carcinoma 537

Chapter 16. Surgeries for Breast Diseases538

- Surgical Anatomy of Breast 538
- Open Biopsy of Breast Lesion 541
- Excision of Benign Breast Lump 542
- Drainage of a Breast Abscess 546
- Microdochectomy 546
- Major Duct Excision (Adair-Hadfield Operation) 546
- Sentinel Lymph Node Biopsy/Dissection 546

- Breast Conservative Surgery 548
- Axillary Dissection 550
- Skin Sparing Mastectomy 550
- Nipple Sparing Mastectomy 551
- Indications for Total Mastectomy/Modified Radical Mastectomy in Breast Cancer 551
- Modified Radical Mastectomy 551
- Different Mastectomies 556
- Reconstruction of the Breast 562

Chapter 17. Surgeries of Salivary Glands.....569

- Surgical Anatomy of Parotid (Para – Around; Otic – Ear) Gland 569
- Facial Nerve 572
- Parotidectomy 573
- Technique of Parotidectomy 574
- Complications of Parotidectomy 579
- Drainage of Parotid Abscess 581
- Submandibular Salivary Gland 581
- Minor Salivary Glands 584
- Ectopic Salivary Gland 585

Chapter 18. Basic Principles in Laparotomy and Laparoscopy586

- General Principles in Laparotomy 586
- Abdominal Incisions 592
- Midline Incision 594
- Paramedian Incision 598
- Transverse Incisions 599
- Oblique Incisions 604
- Loin Incisions 607
- Principles in Closure of the Abdominal Incision Wound 608
- Abdominal Retractors 611
- Drains in Laparotomy 612

- Basic Laparoscopy 619
- Laparoscopic Set 619
- Access to the Peritoneal Cavity 627
- Complications in Laparoscopy 634
- Diagnostic Laparoscopy 635
- Laparoscopic Ultrasound 635
- Three-dimensional Laparoscopy 637
- Single Incision Laparoscopic Surgery 637
- Gasless Laparoscopy (Laparolift) 640
- Haemostasis in Laparoscopic and Open Procedures 640
- Laparoscopic Tissue Approximation 645
- Laparoscopic Port Site Closure 646
- Sterilisation/Disinfection of Laparoscopic Instruments 647
- Disinfection 647
- Sterilisation 651

Chapter 19. Surgeries in Hernia.....653

- Newer Classifications of Groin Hernia 660
- Indirect (Oblique) Inguinal Hernia 660
- Surgeries for Inguinal Hernia 661
- Strangulated Inguinal Hernia 696
- Inguinal Hernia in Females 701
- Ventral Hernia 701
- Newer Concepts in Ventral Hernia 710
- Umbilical Hernia Repair 713
- Epigastric Hernia (Fatty Hernia of Linea Alba) 717
- Femoral Hernia Repair 718
- Spigelian Hernia 727
- Biomaterials Used in Surgeries of Hernia 727
- Complications of Hernia Surgery 729
- Guidelines and Recommendations for Groin Hernia 732

VOLUME

2

Chapter 20. Surgery of Oesophagus735

- Surgical Anatomy 735
- Surgical Treatment for Achalasia Cardia 740
- Per Oral Endoscopic Myotomy 750
- Surgical Treatment for Reflux Oesophagitis 750

Oesophagectomy 760

- Transhiatal Oesophagectomy (Orringer and Orringer, 1983) 760
- Ivor Lewis Operation (Lewis-Tanner) 774
- Left Thoracoabdominal Approach Oesophagogastrrectomy (Churchill and Sweet, 1942) 777

- McKeown three Phase Oesophagectomy with Lymphadenectomy (1972) 778
- En Bloc Resection of Oesophagus (Skinner, 1983) 779
- Three Field Lymphadenectomy for Oesophageal Carcinoma 779
- Minimally Invasive Surgery for Carcinoma of Oesophagus (Video-assisted Approaches) 780
- Complications after Oesophageal Resection 780
- Oesophageal Substitutes 781
- Cricopharyngeal Myotomy with Pharyngeal Diverticulectomy 786

- Management of Oesophageal Perforation 787
- Intubation Surgeries for Advanced Carcinoma of Oesophagus 789

Chapter 21. Surgery of Stomach and Duodenum791

- Surgical Anatomy of Stomach and Duodenum 791
- Surgery for Duodenal Ulcer Perforation 795
- Gastrostomy 799
- Gastrojejunostomy 807
- Vagotomy 813
- Pyloroplasty 821
- Gastrectomy 823
- Total Gastrectomy 842
- Complications of Gastric Surgeries 842
- Ramstedt's Pyloromyotomy for Congenital Hypertrophied Pyloric Stenosis 849
- Duodenum 849
- Surgical Treatment of Superior Mesenteric Artery Syndrome (Wilkie's/Vascular Compression of the Duodenum) 852
- Duodenal Atresia 852

Chapter 22. Surgeries of Small Bowel and Appendix854

A. Small Bowel 854

- Surgical Anatomy 854
- Surgical Treatment of Meckel's Diverticulum 855
- Small Bowel Resection 856
- Enterolysis/Adhesiolysis 868
- Stricturoplasty 872
- Jejunostomy 873
- Small Bowel Perforation 873
- Intestinal Bypass Procedure 878
- Ileostomy 878
- Closure of Ileostomy 882
- Serosal Patch Technique 883
- Small Intestine Atresia (Intestinal Atresia) 887
- Malrotation 887
- Meconium Ileus 888
- Short Bowel Syndrome (Short Gut Syndrome) 889
- Massive Bowel Resection 890

B. Appendix 890

- Surgical Anatomy of Appendix 890
- Appendicectomy 891
- Open Appendicectomy 893
- Complications after Appendicectomy 900
- Faecal Fistula after Appendicectomy 902
- Troubles in Appendicectomy 902
- Small Incision Open Appendicectomy 903
- Laparoscopic Appendicectomy 904
- Laparoscopy Assisted Appendicectomy 907
- Submucosal Appendicectomy 910
- Appendicular Abscess 910

Chapter 23. Surgeries of Liver and Biliary System912

A. Liver 912

- Surgical Anatomy 912
- Liver Resection 917
- Liver Transplantation 941
- Surgical Treatment for Portal Hypertension 945
- Surgeries for Hydatid Cyst 950
- Surgery 953

B. Gallbladder with Extrahepatic Biliary Tree 958

- Surgical Anatomy 958
- Preoperative Preparation and Assessment 963
- Assessment 966
- Preoperative Preparation 970
- Cholecystectomy 970
- Technique of Open Cholecystectomy 971
- Cholecystostomy 983
- Laparoscopic Cholecystectomy 984
- Single Incision Laparoscopic Surgery in Cholecystectomy 996
- Common Bile Duct Exploration 997
- Choledochoduodenostomy 1004
- Transduodenal Sphincteroplasty 1004
- Choledochojejunostomy/Biliary Enteric Anastomosis/Hepaticojejunostomy 1005
- Radical/Extended Cholecystectomy 1013
- Treatment of Bile Duct Carcinoma/Cholangiocarcinoma 1013
- Bile Duct Injuries 1017
- Cholecystojejunostomy 1020
- Treatment of Choledochal Cyst 1023
- Biliary Atresia—Treatment 1024

Chapter 24. Surgeries of Pancreas and Spleen 1026

A. The Pancreas 1026

- Surgical Anatomy 1026
- General Principles in Pancreatic Surgeries 1031
- Surgical Treatment for Chronic Pancreatitis 1032
- Surgical Treatment for Pseudocyst of Pancreas 1049
- Pancreaticoduodenectomy (Whipple's Operation/Partial Pancreaticoduodenectomy) 1052
- Total Pancreatectomy (Total Pancreaticoduodenectomy) 1070
- Distal Pancreatectomy 1071
- Radical Antegrade Modular Pancreatosplenectomy 1076
- Cholecystojejunostomy 1077

B. Spleen 1077

- Surgical Anatomy 1077
- Splenunculi 1080
- Principles in Spleen Surgery 1080
- Splenectomy 1081
- Management of Splenic Trauma 1084

- Laparoscopic Splenectomy 1095
- Complications of Splenectomy 1097
- Mesh Splenopexy 1098

Chapter 25. Colonic Surgeries..... 1099

- Surgical Anatomy 1099
- Lymphatic Drainage 1102
- Nerve Supply 1102
- Principles in Colonic Surgery 1102
- Caecopexy 1105
- Caecostomy 1105
- Colostomy 1105
- Closure of Colostomy 1110
- Treatment for Diverticular Disease of Sigmoid/Colon 1110
- Treatment for Ulcerative Colitis 1117
- Treatment Concept in Carcinoma Colon 1118
- Resection of the Colon 1119
- Right Colectomy 1119
- Left Colectomy 1123
- Laparoscopic Colectomy 1133
- Locally Advanced Tumour (Inoperable) 1141
- Surgical Management in Large Bowel Obstruction 1141
- Treatment for Hirschsprung's Disease 1141

Chapter 26. Anorectal Surgeries..... 1145

- Surgical Anatomy 1145
- Anal Canal 1146
- Principles in Anorectal Surgeries 1151
- Treatment Plan for Carcinoma Rectum 1152
- Anterior Resection/Abdominal Radical Restorative Operation/Anterior Proctosigmoidectomy (Open Method) 1155
- Abdominoperineal Resection 1157
- Laparoscopic Abdominoperineal Resection 1159
- Laparoscopic Low Anterior Resection 1160
- Total Proctocolectomy with Ileoanal Pouch 1161
- Treatment for Rectal Prolapse 1163
- Treatment of Pilonidal Sinus 1174
- Treatment of Haemorrhoids 1181
- Treatment of Anal Fissure 1195
- Anorectal Abscess 1197
- Fistula-in-Ano 1198

Chapter 27. Retroperitoneal Surgeries 1212

- Surgical Anatomy 1212
- Approaches for Retroperitoneum 1212
- Retroperitoneal Lymph Node Dissection 1213

Chapter 28. Urologic Surgeries..... 1216

- Surgical Anatomy of Kidney 1216
- Surgical Anatomy of the Ureter 1218
- Anatomy of Urinary Bladder 1219

- Anatomy of Prostate 1220
- Anatomy of Urethra 1220
- Approaches to Kidney 1221
- Dissection of the Kidney 1228
- Approaches to Ureter 1230
- Treatment of Renal Tuberculosis 1230
- Treatment for Hydronephrosis 1231
- Treatment of Pyonephrosis 1234
- Nephrostomy 1239
- Treatment of Renal Stones 1240
- Removal of Ureteric Stone 1241
- Treatment of Staghorn Calculus 1253
- Treatment of Renal Cell Carcinoma 1255
- Treatment of Polycystic Disease of Kidney 1264
- Treatment of Solitary Renal Cyst 1264
- Treatment of Bladder Stone 1266
- Treatment of Bladder Tumours 1266
- Radical Cystectomy 1267
- Ureterosigmoidostomy (Henri Chaput, 1894, French Surgeon) 1270
- Urinary Diversion 1271
- Ureteric Reimplantation 1272
- Management of Benign Prostatic Hyperplasia 1273
- Prostatic Abscess 1275
- Radical Prostatectomy 1275
- Treatment of Stricture Urethra 1276
- Treatment of Hypospadias 1276
- Treatment of Posterior Urethral Valve 1276
- Treatment of Urethral Stones 1277
- Renal Transplantation Technique 1277

Chapter 29. Adrenal Gland Surgeries..... 1281

- Adrenal Gland Surgeries 1281
- Adrenalectomy 1283
- Technique of Open Adrenalectomy 1285
- Laparoscopic Adrenalectomy 1288

Chapter 30. Surgeries of Penis, Scrotum and Testis..... 1296

- Surgical Anatomy of Penis 1296
- Treatment of Chordee 1297
- Treatment Peyronie's Disease (Induratio-Penis Plastica) 1298
- Treatment of Carcinoma of Penis 1298
- Inguinal Block Dissection—Radical Groin Dissection 1305
- Surgical Anatomy of Scrotum 1315
- Treatment for Hydrocele 1315
- Treatment of Haematocele 1319
- Treatment of Pyocele 1319
- Varicocele 1321
- Treatment of Cyst of Epididymis 1328
- Treatment of Spermatocele 1328
- Surgical Anatomy of Testis 1328
- Undescended Testis 1332

- Ectopic Testis 1333
- Treatment of Torsion Testis 1333
- Testicular Biopsy 1335
- Treatment of Testicular Tumour 1338
- Orchidectomy 1339

Chapter 31. Obesity and Morbid Obesity 1347

- Obesity and Morbid Obesity 1347
- Different Surgeries 1348

Chapter 32. Basic Surgeries in Obstetrics and Gynaecology..... 1352

- Surgical Anatomy of Female Genitalia 1352
- Surgeries in Female Genital Tract 1354
- Dilatation and Curettage 1355
- Medical Termination of Pregnancy 1356
- Bartholin Cyst and Abscess 1359
- Ectopic Pregnancy 1359
- Caesarean Section 1363
- Caesarean Hysterectomy 1371

- Tubal Sterilisation Procedures 1372
- Surgeries for Ovarian Pathology 1373
- Myomectomy 1381
- Hysterectomy 1381
- Nerve Sparing Radical Hysterectomy 1412
- Robot Assisted Laparoscopic Surgery in Gynaecology 1413
- Feasibility of Single Port Laparoscopic Surgery 1413
- Repair of Genitourinary Fistulas 1413
- Transobturator Tape for Stress Urinary Incontinence 1415

Chapter 33. Other Procedures 1418

- Robotic Surgery 1418
- Liposuction 1419
- Dressings 1421
- Bandages 1422

Index..... 1423

Principles of Surgical Management in Trauma

Trauma is the major cause of death worldwide. It can be road traffic accidents, stab injuries, thermal injuries, and gunshot-related injuries.

Inexperienced motor skills, alcohol consumption; aggressive driving, influence of drugs are the common factors for RTA. Gun shot injuries is becoming more common nowadays due to usage of guns for fights. Gun shot can cause local injury, compression injury, cavitation injury (10 times the diameter of the bullet), burn injury. Fall from height is also a major cause as it leads into spinal injury, internal organ injury. Fall from 10 meters height has got impact velocity of 50 kph. Fall from more than 15 meters height carries more than 50% mortality. Nature of landing surface, part of the body coming into contact with the surface first, deceleration force, body's position during landing.

Trauma is categorised as group trauma like in earthquake, train accidents, fire injury, etc. or individual trauma (Fig. 8-1).

War injuries are of special type could be missile wounds, low velocity missile wounds or high velocity missile wounds or blast injuries.

Dictum in trauma is '*first save life; then think of limbs; later worry about sufferings*'.

ASSESSMENT OF SEVERITY OF THE INJURY

AIS (*Abbreviated Injury Scale*) scoring system is used once all injuries of the patient is identified. Each injury is scored from 1 to 6. An AIS score of 6 anywhere in the body is not compatible with life. So maximum score assessed in a live patient is 5. Square of three highest AIS scores within six areas in the body—head and neck; abdomen and pelvic contents; bony pelvis and limbs; face; chest and body surface is called as *Injury Severity Score* (ISS). Maximum ISS score is $5 \times 5 + 5 \times 5 + 5 \times 5 = 75$. Glasgow coma scale and revised trauma scale [$RTS = \text{respiratory weight} \times 0.2908 + \text{systolic blood pressure weight} \times 0.7326 + \text{GCS (Glasgow Coma Scale) weight} \times 0.9368$] are commonly used in head injury patients.

Trauma and Injury Severity Score (TRISS) system is used by combining anatomical and physiological injuries (Figs. 8-2 and 8-3).

Severe trauma may be entrapment, high speed impact, collision, fall from height of more than 3 meters, ejection from a moving vehicle and penetrating injuries.



Fig. 8-1: Thorough warm saline wash is a must to all open wound. Wound excision is done by removing all devitalised tissue. Viable skin part should be retained for future reconstruction. Often such flap can be rotated as quilting into the defect area.

TABLE 8-1: Glasgow coma scale (GCS).

Eye opening		Verbal response		Motor response	
Spontaneous	4	Oriented	5	Obeys commands	6
To Speech	3	Confused	4	Localises pain	5
To Pain	2	Inappropriate words	3	Flexion to pain	4
None	1	Incomprehensible words	2	Abnormal flexion	3
		None	1	Extension to pain	2
				None	1

Total score: 15.
Mild head injury: 13–15.
Moderate head injury: 9–12.
Severe head injury: Less than 8 [3–8].

Score 1—dead or dying.
Score 2—vegetative state.
Score 3—severe disability.
Score 4—moderate disability.
Score 5—good recovery.

**Fig. 8-2:** Scalp trauma exposing outer table partly.

Baton round injury occurs during police firing in mob dispersion. It is rubber bullet/plastic compound injury occurring during police firing. It can cause bruising, lacerations or life-threatening blunt injuries/penetrating injuries also. So *baton round injury* cannot be ignored.

PREHOSPITAL TRAUMA CARE

It is the initial safe resuscitation and proper arrangement and planning for transport as early as possible. It is done by police and fire service people. They should be trained for initial resuscitation. Transportation and ambulance service is essential. Well-equipped ambulance should be available. Transport is done by vehicles, ambulances and helicopters. Careful transport is essential depending

**Fig. 8-3:** Black eye. It may be a sign of intracranial bleed.

on the type of trauma. It is essential in spine injury, chest/abdominal/head injuries. A dedicated resuscitation team is ideal. 3 doctors, 2 nurses, 2 technicians are essential in the team with all essential facilities like central line, fluid therapy, emergency drugs, etc.

TERTIARY HOSPITAL CARE

Airway: Suctioning, clearing throat, clearing foreign bodies/dentures, oxygen, endotracheal intubation, percutaneous cricothyrotomy, tracheostomy are done, depending on need.

Breathing: Breathing is assessed and if needed intercostal tube drainage in case of pneumothorax or haemothorax should be inserted.

Circulation: It is assessed by pulse, blood pressure, capillary filling and monitoring. Proper perfusion and blood transfusion is needed. Two 12 or 14 G cannulas should be passed to have proper intravenous access. In difficult situations when patient is in shock with collapsed peripheral veins, long saphenous vein, cephalic vein, basilic vein, external jugular vein or femoral vein cannulation should be tried. Definitive venous cut down of long saphenous vein or cephalic vein should be done. Percutaneous puncture of internal jugular vein is also possible. Blood samples should be collected for electrolyte estimation, haematocrit, blood urea and creatinine, blood group and cross matching. Central venous catheter should be passed after that in all patients. It is passed through subclavian vein or through internal jugular vein. In children *intraosseous* route is possible to perfuse in emergency (**Fig. 8-4**).

Initially isotonic crystalloid such as normal saline/Ringer's lactate is used. Once around 1,500 mL of crystalloids are infused to bring up the volume, then colloids and blood are given. Dextran, other volume expanders are also used in emergency but



Fig. 8-4: Intensive care is needed in critical trauma patient.

not more than 1,500 mL. It is better to give warmed fluid of any of these forms to prevent hypothermia. Intravenous warmer devices are available. If patient is responding for initial 2 L of fluid therapy means blood loss is more than 40% suggesting severe circulatory failure. *Blood transfusions* are given to maintain haematocrit at 30%.

Nasogastric tube and urinary catheter placement is a must.

Monitoring is done by pulse, oxygen saturation, urine output with a indwelling catheter in situ (should be >1 mL/kg/hour), platelet count, coagulation factors, serum electrolytes estimation, ECG monitoring, CVP and PCWP assessment, arterial blood gas analysis.

Further assessment is done by assessing neurological status, specific injuries in head, skull base, thorax, abdomen, pelvis and fractures. CT of part is ideal investigation. Usually plain CT without contrast is done. Hypoxia, hypercapnia, hypotension are the important critical factors. Spine injury may be missed very often in initial assessment. It should be carefully assessed and if needed/suspected should be evaluated by CT imaging. MRI is not possible in initial phase of resuscitation which should be done at later period.

Often endotracheal intubation, ventilator or tracheostomy may be needed and should be utilised without any hesitation to save the life.

Adequate analgesia is important. Morphine/dimorphine/non-steroidal anti-inflammatory drugs (NSAIDs) intramuscularly can be given. *Temporary immobilisation* using proper splintage for long bone fractures reduces the pain severity. Fixation in pelvic fractures with external fixator reduces the pain. Medical anti-shock trouser (MAST) is used for shock.

Three primary X-rays are done even though they have got limitations. Chest X-ray to see pneumothorax/haemothorax/fracture ribs. But 30–40% of fracture ribs will be missed in X-ray. Cervical spine lateral X-ray and pelvis anteroposterior X-rays are taken.

Ultrasound abdomen, CT of chest, pelvis and abdomen is ideal. Diagnostic peritoneal lavage (DPL) is useful in blunt injury abdomen.

ASSESSMENT OF THE WOUND

Size of the injury; extent of the damage—nerve, vessels, viscera, peripheral ischaemia especially in the limbs, presence of haematoma, extent of deeper injury including bones, entry wound and exit wound in missile injury are carefully assessed (**Fig. 8-5**).

First Aid Management of the Wound

Large occlusive firm pressure dressing of the wound, compression bandage, control of haemorrhage, occasionally tourniquet application, positioning of the patient are the first aid measures often required.

Wound will be minimally contaminated in 0–6 hours; significantly contaminated in 6–12 hours; grossly contaminated in more than 12 hours (**Fig. 8-6**).



Fig. 8-5: X-ray should be taken to see the fracture. Soft tissue injury should be assessed properly.

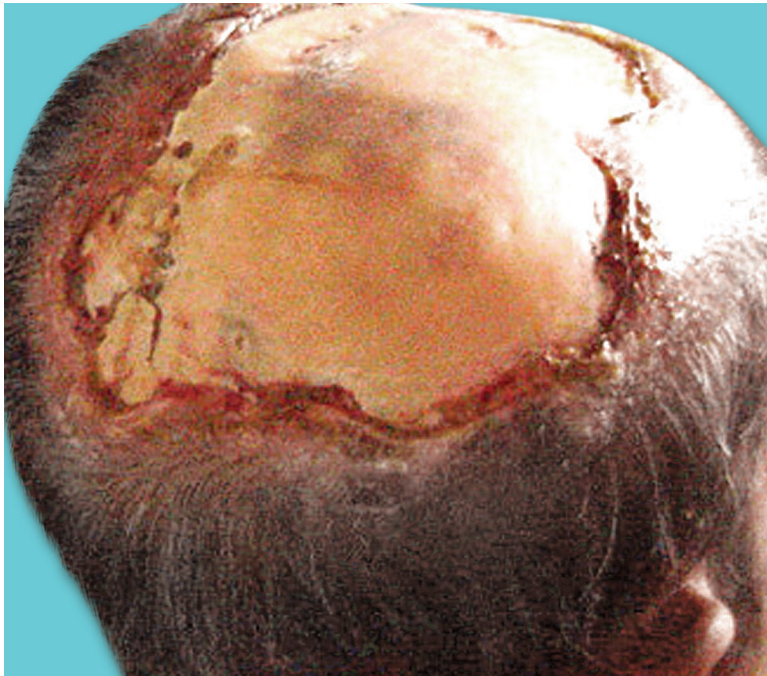


Fig. 8-6: Skull bone is exposed without any retained periosteum. Such bone will not show any granulation tissue. Burr holes in many places on the outer table allow marrow to proliferate as granulation tissue; later area is covered with flap. Care should be taken while doing burr drills to avoid injury to the venous sinuses.

WOUND EXCISION AND MANAGEMENT

Wound excision should be done under *general* anaesthesia. Local anaesthesia should be avoided. Here dead/damaged or contaminated tissues are excised. All foreign bodies should be removed. Exception for this is probably bullet injuries/pellet injuries. It is often difficult to remove a bullet or multiple pellets. They may lie in close proximity to any major vessel or often difficult to identify and remove. During entry they are in high temperature and so are absolutely sterile; will not precipitate any contamination. Control of bleeding is also an essential part in wound excision.

Tourniquet during surgery (wound radical excision) is used only if it is inevitable; otherwise should be avoided as it is difficult to differentiate dead and living tissue under tourniquet. Hairs should be removed 1 cm beyond the margin of the wound. Skin and wound should be thoroughly scrubbed with soap, water and saline for 5–10 minutes until it appears clean and then area is widely cleaned with povidone iodine before draping. Proper initial irrigation of the contaminated wound often using pressure device is important to remove dirty particles from the surface. Incision placed in the wound should be enlarged/extended liberally without any hesitation especially in penetrating wounds, war wounds, bullet wounds, crush wounds, entry wound of bullet, multiple deep wounds. Exploring the entire wound is very important. Excision is done until healthy bleeding live tissue is reached. Excision should be done by sharp dissection using knife or scissor. Underlying nerves and major feeding vessels should be protected. Skin is excised for 2 mm from the contaminated edge. There is no use in retaining the dead tissue and no point in cutting healthy skin which is again essential for future closure or reconstruction. Wound can be re-inspected for further wound excision if needed especially skin after 48 hours.

Often *flap-like injury* when found with a wide base can be retained provided it is relatively healthy. Crushed skin may not be vital for placing. Flap should be washed, irrigated and placed over the raw area. When such flap sustenance is not sure, the flap can be

cut completely, fat underneath should be cleared and sutured like a free full thickness graft. If possible split thickness graft is taken from the surface of such flap using a Humby's knife, and is very well placed on the defect area which often takes properly. Fat in the entire area should be excised otherwise it is a sure way of causing necrosis and contamination of the area in later period. Fascial layers should be split. Ragged devitalised part should be excised. Oedema underneath the fascial layer causes initial impairment of venous and lymphatic drainage later blocking arterial function leading into distal ischaemia, necrosis and gangrene. Lengthy liberal fasciotomy is a must in these patients. All *devitalised, dying and dead muscles* should be excised without fail. There is no reason to retain the dead muscle at all. Dead muscle is a sure way for infection like *Clostridium* bacteria. All haematomas should be evacuated liberally. After radical wound excision if there spurting bleeders, it should be ligated securely using fine absorbable sutures (**Figs. 8-7 to 8-10**).

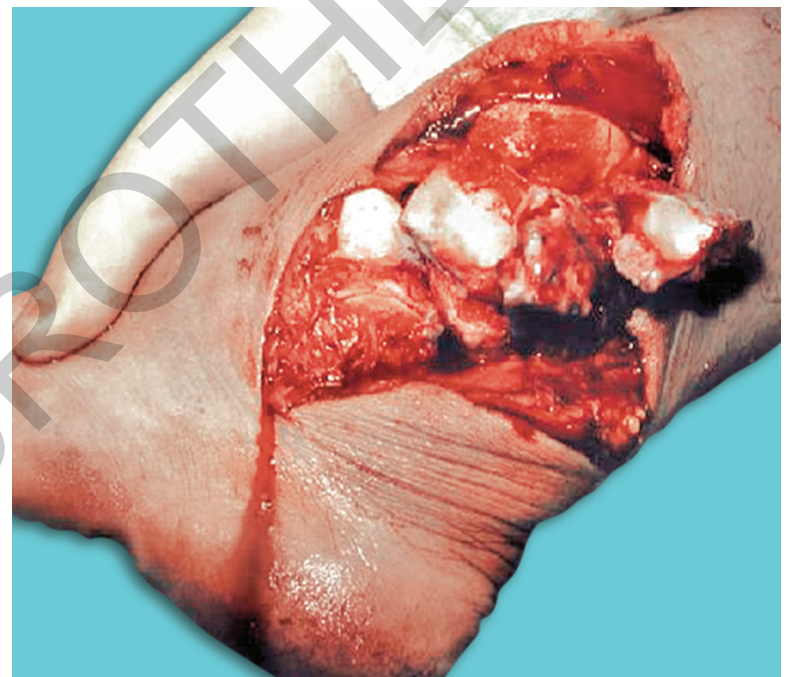


Fig. 8-7: Crush injury of ankle.



Fig. 8-8: Degloving injury of buttock region. It is eventually covered using a flap.



Fig. 8-9: Extensive injury in a child due to dog bite. Wound debridement should be done under general anaesthesia.



Injury lower lip



Repair of the injury

Fig. 8-10: Injury to the lower lip causing defect in its central part which is primarily repaired.

Nerve injury is dealt in different ways. If wound is clean and healthy it is sutured primarily with non-absorbable sutures; otherwise it is trimmed and tethered to the adjacent soft tissues loosely using

non-absorbable sutures to prevent recoiling. Later once wound is clean it is taken up for repair. Many nerves when injured should be tagged in different coloured sutures for eventual identification purpose.

Exposed tendons can be left alone; but if paratenon is denuded it should be excised as tendon will necrose. Repair of tendon may be done at later period in such occasion. If it is a clean incised tendon injury then only primary repair of tendon is done.

Bone even though injured until periosteum is intact, it heals well. Skin can be covered over periosteum. If periosteum is denuded then flap is needed to cover it. Bone fixation, prevention of sepsis and flap cover is the needed plan in these patients.

Joint injury needs early immediate cover to prevent from anticipated infection. Synovium should be sutured with interrupted sutures. Proper wound cleaning with adequate ideal antibiotics are mandatory.

Major vessel injury should be sutured as per vascular anastomosis rule.

Body cavities when opened by trauma should be closed. Dura should be closed by temporalis fascia graft.

Primary closure means closure done immediately after wound excision. Delayed primary closure is done in 5 days after wound excision. Secondary late closure is closure done after 5 days. When in doubt do not close the wound immediately—is the principle.

■ PRINCIPLES IN USAGE OF ANTIBIOTICS

It is a debate whether to use it or not. In minor wounds it is not necessary to take antibiotics or a single intravenous dose is sufficient. In major wounds it is essential to give antibiotics intravenously; an oral antibiotic in initial phase of therapy is less preferred one than intravenous one. Intravenous penicillin or cephalosporins are given conventionally. Higher generation antibiotics are used depending on the need and contamination.

One should remember that antibiotics are not a substitute for adequate wound care. There is no short coming in proper wound care to have a good final outcome.

Gas gangrene is more common in deep ragged wounds, crush injuries, war wounds, blast injuries. Radical wound excision and closure of wound only at later period are the important preventive measures. In suspected cases anti-gas gangrene serum should be injected.

Immobilisation is often very important in major wounds even if there is no bone injury. Immobilisation improves healing; reduces the pain; possibly decreases the infection rate.

■ MANAGEMENT OF FOREIGN BODY

Unlike many think it is usually not an emergency procedure unless it is causing life-threatening problems. Image intensifier (C-arm) should be used to remove foreign body. It should be done under general anaesthesia. Tourniquet is used when it is in the limbs. Adequate incision with wide exposure is a must. Gentle finger exploration is better than by instruments as feel of the foreign body by fingers is more appreciable than through the instrument. Every foreign body need not be removed (like bullets/pellets). Foreign body if not retrieved in 45 minutes of exploration, procedure should be abandoned.

TRIAGE

Triage: Triage means 'To sort' in 'French'.

Triage was formulated by a committee of Trauma of the American College of Surgeons.

Advanced Trauma Life Support (ATLS) is essential for first hour care of an injured patient.

Pre-hospital Trauma Life Support (PHTLS) is to prevent deaths while injured patients are transported to the hospital.

Types of Triage System

Multiple casualties: Staff and facilities are sufficient, net priority is given to life-threatening injuries.

Mass casualties: Staff and facilities are not sufficient to manage. Here those who are likely to have highest chance of survival are given priority.

CONCEPTS IN TRAUMA MANAGEMENT

Concept of 'golden hour' to treat the trauma patient is important. Multidisciplinary approach; planning, setting up, organising, team work; assessing respiratory system; circulation; bleeding areas—as priority; assessing also whether patient is haemodynamically stable or unstable; arranging fluids, blood, catheters, ventilator, etc. Further definitive therapy is undertaken depending on severity and site of injury.

DAMAGE CONTROL SURGERY

It includes—resuscitation and early therapy in operation theatre itself; minimum but essential surgery to control bleeding and prevent contamination; secondary definitive surgery at a later period to have final control.

Assessing four components

- Physiologic response.
- Anatomical injury.
- Biomechanical injury.
- Comorbid factors.

Triage algorithm

STEP ONE (Assess physiological impact)

- ◆ Measure vital signs and level of consciousness.
 - By Glasgow coma scale.
 - Systolic blood pressure.
 - Respiratory rate.
 - Revised trauma score. It is based on airway, laryngeal injury, spine injury, maxillofacial injury.

STEP TWO (Assess anatomical impact)

- ◆ All penetrating injuries to head, neck, thorax, major burns, fracture bones, pelvic fractures, paralysis.

STEP THREE (Assess mechanism)

- ◆ Automobile accidents, crash or blast injuries, high energy injuries, fall from more than 20 feet.
- ◆ Bullet injury.

STEP FOUR (Assess history)

- ◆ Patient's age below 5 years or age more than 55 years.
- ◆ Cardiac diseases, respiratory and metabolic diseases.

Contd...

- ◆ Pregnancy.
- ◆ Patients with bleeding disorders.
- ◆ Immunosuppressed individuals.

BASED ON THE STEP CONSIDER TO SHIFT THE PATIENT TO TRAUMA CENTRE & TRAUMA TEAM SHOULD BE KEPT ALERT.

It is important in multiple and mass casualties (fire, blasts, automobile accidents, train accidents).

Management includes: Goals; primary management; investigations; secondary survey; definitive care.

Tag the patient accordingly

Red colour: Immediate treatment is required.

Yellow colour: Urgent treatment is required.

Green colour: Delayed treatment is required.

Blue colour: Expectant treatment is required.

Black colour: Deceased.

Primary management—ABCDE

AIRWAY

- ◆ Chin lift.
- ◆ Jaw thrust.
- ◆ Nasal airway.
- ◆ Oral airway.
- ◆ Endotracheal intubation.
- ◆ Tracheostomy.
- [Assess airway patency].

CIRCULATION

- ◆ Monitor vitals.
- ◆ Heart sounds.
- ◆ Electrocardiogram
- ◆ IV fluids blood transfusion.
- ◆ Treatment of shock.
- ◆ Control of external bleed.
- ◆ Use two IV lines—14G/16G.

EXPOSE THE PATIENT FULLY

- ◆ Undress the patient.
- ◆ Hypothermia assessment.
- ◆ Assess injuries.
- ◆ Examine joints, bones, abdomen, other systems.
- ◆ Look for identification marks.

BREATHING

- ◆ 100% oxygen.
- ◆ Assess bilateral chest raise.
- ◆ Assess breath sounds.
- ◆ Use pulse oximetry.
- ◆ Treat flail chest, pneumothorax.
- ◆ Intercostal tube drainage.

DISABILITY EVALUATION

- ◆ Neurological examination.
- ◆ Glasgow coma scale.
- ◆ Pupillary reaction.

FINGERS and TUBES

- ◆ Examine all orifices like P/R, P/V, etc.
- ◆ Use required tubes like catheter, Ryle's tube.

Goals	Investigations
Identify life-threatening conditions.	X-ray spine, chest, pelvis, extremities.
Decide and implement appropriate treatment to the area of trauma.	CT scan.
First think of salvage of life, then think of salvage of limb.	Blood group and cross matching.
Rapid assessment, rapid resuscitation, rapid stabilisation.	Arterial blood gas analysis.
Optimum, complete care.	Serum electrolytes.
Transport efficiently to higher trauma centre.	Ultrasound abdomen.
Categorise the patient.	
i. Deceased.	
ii. Walking wounded.	

Contd...

Contd...

Contd...

iii. Immobile wounded.	
iv. Trapped wounded.	
Secondary survey	Definitive care
Re-evaluate the patient completely again.	

NECK INJURIES

Neck is divided into zones for managing neck injuries. Zone I is from clavicle to cricoid cartilage. Injury here may extend into the mediastinum/thorax. Zone II is from cricoid cartilage to angle of the mandible. Zone III is above the angle of the mandible. Injury here may extend into cranial cavity or skull base; extended vascular injuries here are quite difficult to manage (Fig. 8-11).

Indications for neck exploration in injuries are: Expanding haematoma; uncontrolled external haemorrhage; decreased carotid pulse; stridor, hoarseness, dysphonia, haemoptysis; severe dysphagia, odynophagia; blood in oropharynx. Vital structures in compact area make neck injury an area of priority. Penetrating injuries of major vessels (20%), trachea, oesophagus, thyroid, and nerve plexus can cause severe problems. Exact anatomical extent of the injury should be assessed. Extension into pharynx, larynx, chest or mediastinum should be thought of. Anterior triangle injuries pose a high threat than posterior triangle injury. CT neck is the ideal investigation for neck injuries. One must also think of possible injuries like Le Fort facial injuries; cervical spine injuries; skull base injuries which should be assessed clinically and radiologically properly before jumping into hurried intervention.

Treatment

Patient with aerodigestive and vascular injury needs neck exploration. It is the exploration of the neck rather the wound as such is important. Oblique incision along the anterior border of the sternomastoid is done in unilateral injury. Bilateral connecting collar incision along the anterior borders of the both sternomastoid muscles is used for bilateral injuries of the neck (Fig. 8-12).

Intraoperative endoscopy to identify injuries of trachea and oesophagus is beneficial. Methylene blue instillation into the oesophagus will identify the oesophageal tear. Neck is explored with adequate incision under general anaesthesia. Suturing of the injured structure like carotid, oesophagus, trachea, muscles, etc. is done. External carotid artery can be safely ligated. Internal carotid or common carotid requires repair often using vein or polytetrafluoroethylene (PTFE) graft. Tracheal injury up to two rings can be repaired primarily using interrupted non-absorbable sutures like polypropylene. Loss of more than two rings needs tracheostomy. In laryngeal injuries cartilage fractures should be reduced; mucosal lacerations should be sutured. Oesophageal injury if identified within 12 hours sutures of injury is repaired primarily in two layers of interrupted PDS/vicryl sutures with nasogastric tube in situ. Drain to the wound is a must. Injury identified after 12 hours of trauma or extensive injury of cervical oesophagus needs initial cervical oesophagostomy and later reconstruction. Often total oesophagectomy with gastric/jejunal colonic interposition may be needed. Antibiotics, blood transfusion, nasogastric tube passing—as required.

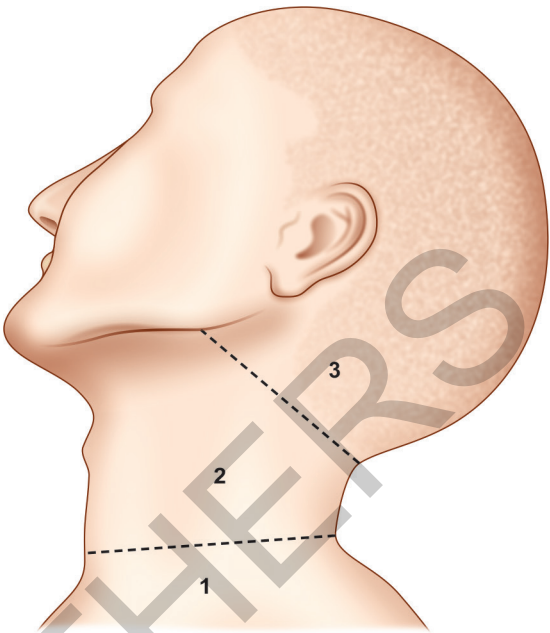


Fig. 8-11: Neck zones used in neck trauma.

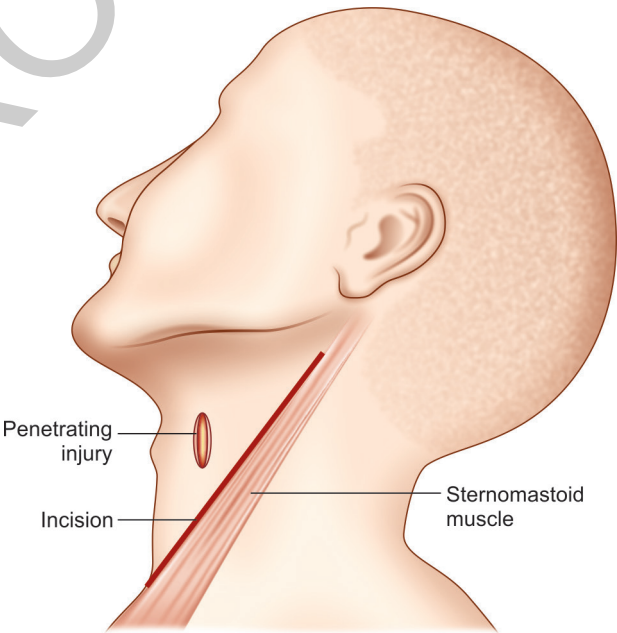


Fig. 8-12: Incision in neck trauma is oblique one along the anterior border of sternomastoid muscle.

THORACIC TRAUMA

Thoracic trauma is the cause of 25% of all trauma deaths. Cardiac injury is the cause for early deaths. Airway obstruction, tension pneumothorax, massive haemothorax, cardiac tamponade are other causes of death which are actually preventable in golden hours. Chest trauma causes hypoxia, hypercapnia and acidosis. Chest X-ray, CT chest and ultrasound chest are diagnostic methods in chest trauma. But in severe critical cases one should not wait for these investigations. Instead it is better to take up straight a way the therapeutic measures like intercostal tube drainage (tube thoracostomy), aspiration of tension pneumothorax and cardiac tamponade.

The *thoracostomy (ICT drainage)* is done in midaxillary line in 6th intercostal space. In slight head up position, after injecting xylocaine 1% local anaesthesia, 1 cm incision is made in the space in lower part of the space to avoid injury to the intercostal vessels. External and internal intercostal muscles are split; pleura is opened; finger is inserted and blunt finger dissection is done; mattress stay suture is loosely placed using polyethylene suture; 40 French intercostal tube with end and side holes is introduced. Tube is directed above and posteriorly. Tube is secured to the skin by tying the tube. Tube is connected to under water seal apparatus. If pre-insertion suture is not placed, suture is placed later after inserting the tube. Post-operative air column movement is observed. *Absence of air leak; fluid drain less than 100 mL/day; chest X-ray* if shows adequate expansion then tube can be removed safely.

Twenty percent of patients with chest trauma need thoracotomy and definitive repair of injured intrathoracic structures. *Indications are*—massive haemothorax with more than 1,500 mL of blood in ICT when passed or hourly drainage if more than 300 mL/hour; pericardial/cardiac injuries; thoracic cage open wounds; thoracic vascular injury; tracheobronchial tree injury; oesophageal injuries. All these indications are critical and life-threatening situations. But still if proper cardiothoracic set up is available and timely intervention is done, life can be saved (**Fig. 8-13**).



Fig. 8-13: Open communicating wound in thorax/cheat wall.

Rib fractures are the commonest type of chest trauma. But commonly it does not cause problem unless there is haemothorax or pneumothorax. 4th to 10th ribs are commonly fractured. Rib fracture causes severe *pain, reduces the ability to cough, and reduces vital capacity causing atelectasis and pneumonia*. Pain on *inspiration* is the main feature in rib fracture along with *crepitus*. Proper pain control is essential using intravenous analgesics, epidural analgesia. *Flail chest* (15%) with fractures in two or more ribs, with each rib having two or more fracture sites causes chest wall instability → paradoxical movement of the chest wall (during inspiration flail segment is drawn in) → pendular movement of the air → mediastinal flutter → sudden kinking of great vessel → respiratory failure and cardiac arrest. It can be anterior, lateral or posterior. Pain and pulmonary contusion is common. Endotracheal intubation, ICT placement, tracheostomy, prevention of movements of flail segment is needed.

Pulmonary contusion is a different typical recognised entity. It can be commonly due to blunt trauma or often due to penetrating injury. It commonly causes respiratory failure. So along with management of mechanical problem, respiratory problems also should be dealt with carefully. Arterial blood gas analysis is a must. *Measures are*—crystalloid infusion, oxygen support, avoiding fluid overload, maintaining the tissue perfusion, blood transfusion, ventilator support, transfusion of packed cells and blood products.

Pneumothorax: It can be *small* pneumothorax with volume loss is 1/3rd of normal lung volume; *large* pneumothorax with complete collapse of the lung on one side but without any tracheal/mediastinal shift; *tension* pneumothorax which is a critical emergency situation with tracheal and mediastinal shift towards opposite side causing *hypotension* decreased cardiac venous return, cardiac arrest and acute respiratory distress or *open pneumothorax* with a large chest wall *sucking open wound*. Pneumothorax needs ICT placement in 4th space in midaxillary line. Tension pneumothorax needs emergency placement of *wide bore needle in midclavicular line in 2nd intercostal space* with a glove finger placed over the hub of the needle to prevent air getting sucked inside during expiration; later ICT should be placed. Open pneumothorax needs open *surgical closure* of the chest wall defect with an ICT in place (**Fig. 8-14**).

Haemothorax: 80% of haemothorax is treated by ICT placement. Remaining 20% needs thoracotomy and control of bleeding like resection of lung.

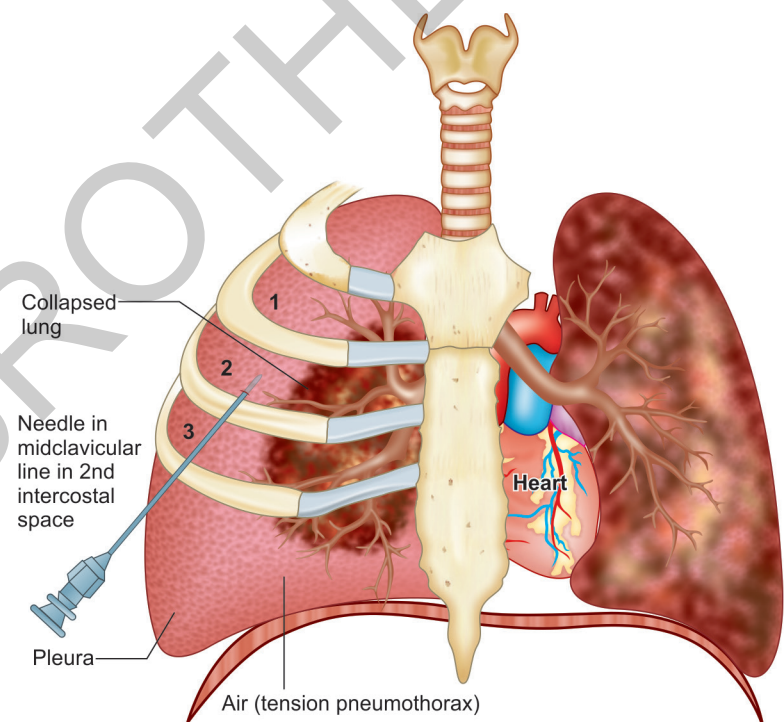


Fig. 8-14: Emergency aspiration through 2nd intercostal space in midclavicular line is life saving measure in tension pneumothorax.

Intercostal Tube Drainage (For Details—Refer Chapter 7)

It is done head up lying down position or supine position. Chest should be done and if possible ultrasound thorax. Cleaning and draping is done. After injecting the local anaesthesia in safety zone, skin is incised transversely for 3–4 cm in 5th space in its lower part (to avoid neurovascular injury); fascia is incised, external and internal intercostal muscles are incised and split using Kelly's haemostat; gentle push across the pleura feels 'the giving way' of entering the pleura. Pathological fluid (blood/air/fluid) will gush out. Required sized ICT tube with multiple fenestra (8 or 32) is passed across the wound into the pleural cavity. Tube is sutured to skin using monofilament non-absorbable suture; it is often better to place and keep ready the suture in place prior to insertion of the tube. Other end is connected to the ICT bag/bottle or canister. ICT bag should be filled with normal saline as specified up to the mark. Column movement and bubbling and quantity collected immediately should be noted. Check chest X-ray should be done (**Figs. 8-15 and 8-16**).

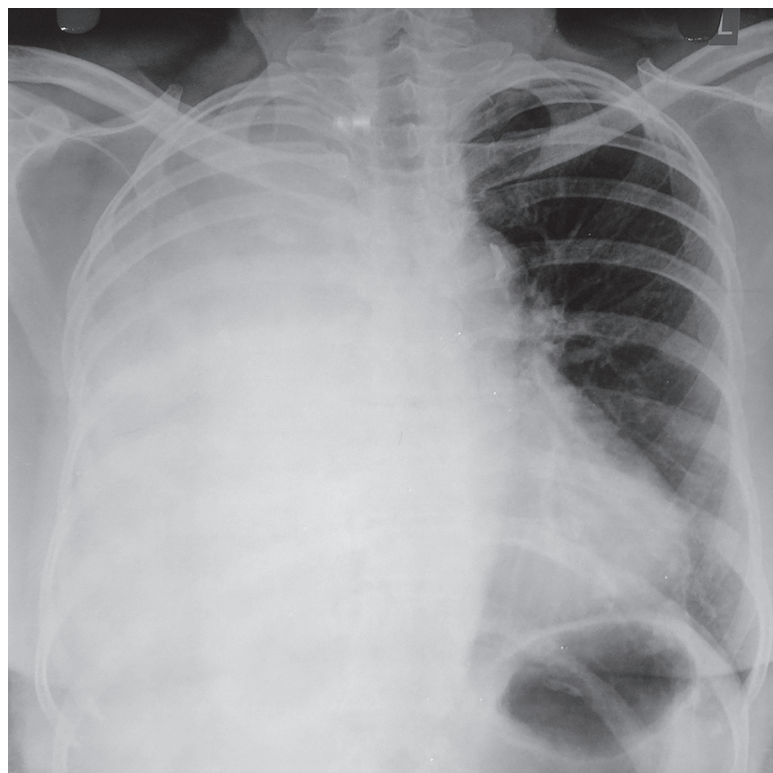


Fig. 8-15: Chest X-ray showing right-sided haemothorax.



Fig. 8-16: ICT placed for haemothorax after chest trauma.

'C S' Perspectives on ICDs

The Intercostal Drain (ICD) is a CRUCIAL SAVIOUR for All Thoracic Surgical Pathology (By Professor CS Rajan, Bengaluru)

ICDs Need—14 CORRECT STEPS (7 + 7)

◆ Cautious Siting (Insertion)

1. Corroborate the **Side** (clinical and check chest X-ray).
2. Choose **Site** (triangle of safety).
3. Copious **Soothe**r (use large amounts of local anaesthesia/LA).
4. Create **Shaft** (blunt track dissection, use finger to confirm).
5. Capable **Sutures** (to anchor tube to chest wall).
6. Controlled, **Soft Entry** (*no force to be used*).
7. Check **Snapshot** (check X-ray, to confirm entry into chest).

◆ Caboxreful Scrutiny (Management)

1. Continuous **Swing** (respiration related oscillations in tube below water level).
2. Connections **Secure** (between emerging drain from chest, tubings and bottle).
3. Constant (Under Water) **Seal** (the non-reflux valve, kept 1 metre below).

Contd...

Contd...

4. Consider **Suction** (if needed).
5. Commend **Spirometry** (chest physiotherapy is a must).
6. Condition and **Shadow** (check X-ray) Improvement.
7. Co-ordinated **Separation** (timing and method of removal of the ICD).

Complications and Solutions for ICDs

1. Crooked **Stationing** [wrong position of tube (subcutaneous or abdominal)]—will need full re-insertion of tube under aseptic precaution.
2. Central **Structure** and Visceral Injury (during insertion) a true catastrophe, call for cardiothoracic help and react fast to treat the shock.
3. Conduit **Shuts down** (tube gets blocked), needs proper/frequent 'milking' and clearing of blood clots/fibrin plugs in the tube.
4. Chest (tube) **Slippage** (drain/drain holes come out of chest cage), reposition the chest tube into the chest under aseptic precaution.
5. Crepitus **Subcutaneous** (surgical emphysema), usually settles with time, but if air leak around chest drain site, may need a deep skin suture to make site air tight.
6. Confused **Shift** (paradoxical/re-expansion pulmonary oedema), especially in long standing effusions/empyema, avoided if drainage is controlled to empty out of the chest gradually, and not all at one time.
7. Channel (wall) **Suppuration** (chest wound/chest cavity infection), both insertion and subsequent daily management need full aseptic technique at all times.

'C S' Perspectives about Thoracic Empyema (and Pneumothorax too)...!

The 'Comprehensive Suggestions'

1. **Complete Story** to be elicited. All details of the history of the illness, especially duration of the chest symptoms.
2. **Clinical State** to be assessed. It involves complete general examination and a full assessment of the chest following the set pattern of inspection, palpation, percussion and auscultation.
3. **Chest Skiagram**, or the radiography of the chest is the first imaging modality to be asked for and read carefully.
4. **Confirm Status**, by the diagnostic aspiration, better under image control localisation, with fluid analysis to give stage of disease.
5. **Culture and Sensitivity**, of aspirated fluid including a smear for AFB
6. **Check Sputum** for infection and also for AFB by the ZN stain.
7. **Computerised Scan**, to get cross sectional with sagittal and coronal reconstructions to get the 3D evaluation of the disease process in the chest. It is important to look at both, the 'lung' and the 'mediastinal' windows. The HRCT of the chest is NOT ideal for assessing empyemas.
8. **Confirmatory Scopy** (fiberoptic bronchoscopy) is needed to rule out endobronchial lesion and obstruction. Laboratory analysis and stains of bronchoalveolar lavage give a better yield for Koch's.
9. **Choose Strategy**. This is crucial, and determines outcome. It is a planned intervention in discussion with the medical and radiological teams. *Within the first 2 weeks, minimal access by VATS is now the standard of care.* When the clinical duration is over 2 weeks and scans suggest development of a cortex, then a formal thoracotomy is indicated to achieve complete decortication.
10. **Closed Solution** of either just an ICD or the VATS procedure is chosen when the disease is in early presentation and there is no cortex seen on imaging.
11. **Cut (with) Scalpel**, or the open procedures is offered to those with complex collections/loculations, especially in inaccessible parts of the chest (Mediastinal/Hilar). A rib resection over the collection, a mini-thoracotomy and clean up or the formal thoracotomy with decortications is the open procedures.
12. **Clean and Scavenge**. The opportunity to enter the chest must ensure complete removal of all toxic material, pus, flakes, cortex from ALL aspects of the lung, costal, apex, diaphragmatic, mediastinal and interlobar fissures. Closure is ALWAYS with a wide bore intercostal chest drain (the ICD) with the underwater seal.

Contd...

Contd...

13. **Combined Support**, of the anaesthetists for pain relief, physiotherapist for breathing exercises to inflate the collapsed lungs, and nursing to ensure proper care of the ICD, the other vitals and the nutrition.
14. **Conduit Supervision**. It is mandatory the surgeon has a personal review of the ICD during the entire length of its stay in situ. The look for the air leak, the quality and quantity of drainage, and the ensuring of patency are vital to the outcome. Removal may often be delayed, and patients are sent home to allow time for recovery.
15. **Continued Surveillance**. This often goes well beyond the hospital stay of the patient, and involves loads of encouragement and solace giving to the patient.

By the use of the above 15 'C S', the benefits are....more 'C S'...!

1. **Control** (of) **Sepsis**.
2. **Clean Shadows**, meaning radiological improvement.
3. **Clear Sounds** on auscultation showing equal and clear air entry in both lung fields.
4. **Customer Satisfaction**, with the patient being able to return to full activity soon.
5. **Comforting Sleep** for all..!

With permission from Professor, Dr CS Rajan MS, FRCS, Consultant Surgeon, Mallya Hospital and Annaswamy Mudaliar General Hospital, Bengaluru; Ex-HOD of Surgery, St. Martha's Hospital, Bengaluru (2003-2013), authentic teacher, guide, mentor to many more students and postgraduates, examiner for MS, DNB and other examinations, an excellent sports person and orator; but a simple, humble person with humility.

Pulmonary injury: Small lacerations of the lung are common but are treated with ICT. 10% of patients will have large significant lacerations with massive air leak through ICT. It needs thoracotomy, lung sparing resections like non-anatomic resection or tractomy using stapling device. Extensive lung injury occasionally needs lobectomy or pneumonectomy as life-saving measure. Persistent air leak in ICT may be due to bronchopleural fistula.

Tracheobronchial tree injury is difficult to manage. It needs initial bronchoscopy to identify the site and extent. Later thoracotomy is done to explore entire tracheobronchial tree, depends on the side of injury. Small injury heals spontaneously. Injury more than 1/3rd of the circumference of the tracheobronchial tree needs primary repair using polypropylene interrupted sutures with selective intubation of the opposite bronchus. Collapse of lung, stricture of tracheobronchial tree, pneumonia and septicaemia are distressing complications.

Cardiac injury: Blunt injury to anterior chest wall causes cardiac trauma. It may be minor contusion of the wall, major contusion, cardiac chamber rupture, haemopericardium and death. Right ventricle is commonly affected as it lies near to the anterior chest wall. If patient reaches the hospital it is diagnosed by US chest, echocardiography, CT chest and ECG. ECG and raised serum troponin I level suggests early or late myocardial damage. *Treatment* in small contusions is continuous ECG monitoring and observation. Major injuries need *urgent thoracotomy* and surgical repair by cardiac surgeons. *Pericardial tap* may be helpful in haemopericardium. Mortality rate is more than 80% in major cardiac injuries. During admission if pulse is felt survival rate increases to 70% with proper intervention and care. Even cardiac tamponade due to haemopericardium needs early open surgical intervention as tamponade itself is a temporary natural haemodynamic compensatory mechanism.

Oesophageal injuries: Thoracic oesophageal injuries are rare as it is located in posterior mediastinum. It occurs due to deep penetrating injuries. It is often difficult to diagnose. It is always associated with other thoracic injuries. Oesophagoscopy and oesophagography, increased oesophageal pressure, CT chest may reveal oesophageal

injury. Problems with oesophageal injury are—empyema, mediastinitis and septicaemia. If identified within 24 hours of trauma, early debridement, primary repair, and drainage with nasogastric placement is the treatment. If identified after 24 hours, mediastinal sepsis is likely and so needs diversion with cervical oesophagostomy, feeding jejunostomy, oesophageal resection, later colonic/gastric transposition.

Diaphragmatic injury: It can occur in thoracic or abdominal injuries. It can be diagnosed by CT scan. But more often it is identified during laparotomy or thoracotomy. It is sutured using interrupted horizontal mattress sutures with polypropylene sutures.

ABDOMINAL TRAUMA

Abdominal trauma is a major emergency surgical problem which surgeons face. It is often associated with head, chest, pelvic and bone injuries. Often patient may be unconscious causing difficulty in diagnosing the condition. Often while giving more importance to other systems like head, thorax and bones and abdominal injury is not addressed properly causing life-threatening consequences. When patient is conscious, history related to abdominal trauma is useful. Abrasion over the abdominal skin suggests possibility of internal injury (*London's sign*). Distension, tenderness, rebound tenderness, fullness and dullness in the flank, when present one should presume internal injury. Tachycardia, hypotension, shock may be evident when there is significant haemoperitoneum. Injuries may be organ injuries like of liver, spleen, kidney, pancreas. etc; or bowel injury or retroperitoneal injury which is often underdiagnosed or missed. Major vessel injury like inferior vena cava, mesenteric vessels can cause real threat to life unless it is identified and managed early. 25% of entire trauma patients need surgical exploration of the abdomen.

Abdominal trauma can be *blunt or stab/penetrating or abdominal wall injuries*. Spleen is the commonest organ involved in *blunt trauma*. Often in blunt trauma first part of the jejunum or ileocaecal junction gives way (blow-out effect) due to traction causing often complete transection of bowel horizontally close to the junction. It is due to force of the mobile part of the bowel over fixed part of the bowel. Liver is the commonest organ involved in *penetrating injuries* (**Fig. 8-17**).

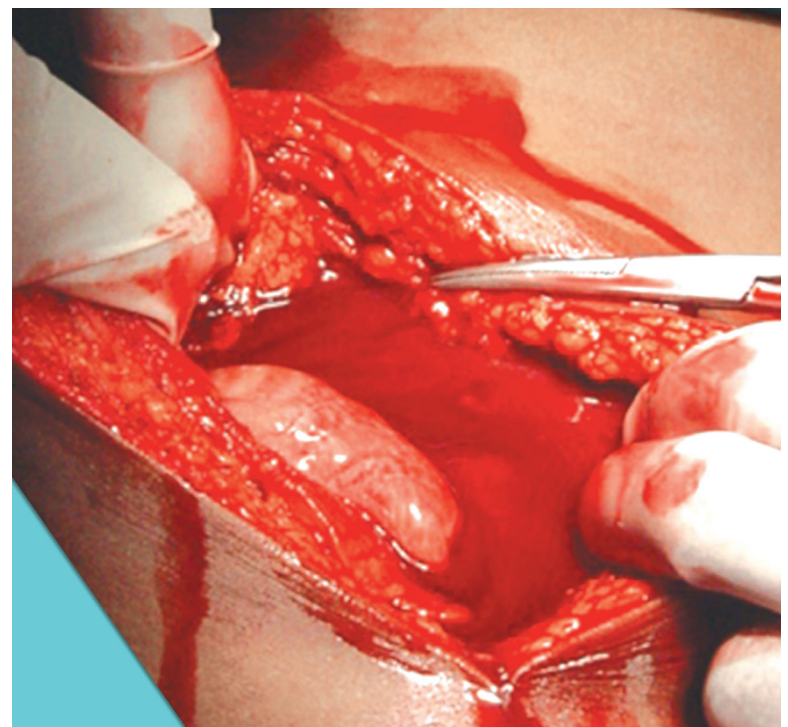


Fig. 8-17: Haemoperitoneum on table.

Injuries of the abdomen may be *closed injuries, compression injuries and penetrating injuries*. Penetrating injury may be low velocity injury like stab or high velocity injury like gunshot injury. Blunt weapon penetration causes lesser deep trauma than sharp weapon trauma (sickle, knife). In sickle injury tip and sharp edge moves in curved pattern and so it is often difficult to predict the depth, track and organs injured (**Figs. 8-18 and 8-19**).



Fig. 8-18: Penetrating injury of the abdomen and chest right sided. Patient fell over a tree which had its top end cut. Tree has penetrated into her abdomen and chest wall. Patient was brought after cutting the tree from its root. Patient survived after surgery.



Fig. 8-19: Stab wound in the abdomen with omentum protruding through the wound.

Blunt trauma is common in accidents. It is often missed or lately diagnosed. Ultrasound/CT abdomen or diagnostic peritoneal lavage (DPL) is useful. In many cases on clinical grounds direct exploratory laparotomy is done. Plain X-ray abdomen may show gas under diaphragm.

Difficulty arises in *deciding about the need for laparotomy* in abdominal trauma in *unconscious* patients. If external injury is not severe in proportionate to the existing severe shock then exploratory laparotomy is indicated in an unconscious patient. It is also often difficult to diagnose bowel injury in such patients. If it is suspected laparotomy should be undertaken in such patients.

Routinely followed indications in abdominal trauma are—hypotension without any other cause; bleeding through wound; continuous bleeding from nasogastric tube; evisceration of abdominal content through the open wound except in case of protruded omentum without any hypotension and features of peritoneal irritation; air under diaphragm in blunt abdominal injury (not in penetrating injury as external air gets sucked into the peritoneal cavity through the wound).

Ultrasound abdomen is very useful, simpler, non-invasive method of evaluating the abdomen. Negative ultrasound means no immediate further work is needed and also can be treated conservatively. *Advantages of ultrasound* are—there is no danger of radiation; it can be done at bedside; it can be repeated many times; it is cost effective. It is less useful in obesity, with gas interposition, intraperitoneal fluid less than 500 mL; retroperitoneal injuries and bowel injuries. Its sensitivity is 90%; specificity is 98%. Focused Abdominal Sonar

(ultrasound) for Trauma (*FAST*) is very useful method. FAST is rapid, non-invasive, portable bedside method of investigation focusing on pericardium, splenic, hepatic and pelvic areas. Blood more than 100 mL in cavities can be identified. It is not reliable for bowel or penetrating injuries. It often needs to be repeated.

Diagnostic peritoneal lavage (DPL) (by Perry) is useful in *blunt injury* abdomen. It is not very useful in penetrating injury, bowel injury, retroperitoneal and pelvic injuries. It is the *procedure of choice in physiologically unstable patient* with blunt abdominal injury (like with spinal injury, unconscious patient, in situations where clinical signs cannot be interpreted, where injuries of more priority are in other areas like head or chest). 10 French polyvinyl catheter is used. Urinary bladder is emptied by passing a catheter. After injecting xylocaine local anaesthesia in subumbilical region, 2–3 cm vertical subumbilical midline incision is made. Skin, linea alba is incised. Local anaesthesia is infiltrated into the peritoneum again. Peritoneum is held with two haemostats and a purse string suture is placed using polylactic acid absorbable suture material. Peritoneum is incised for 3 mm length. Catheter (standard peritoneal dialysis catheter) is introduced into the peritoneal cavity. If blood enters the catheter immediately, it means early laparotomy is needed and carried out without continuing the peritoneal lavage. If otherwise, one liter of normal saline is infused into the peritoneal cavity rapidly in few minutes through the catheter using a drip set with elevation of the fluid bottle/bag. Patient is moved well to mix the fluid in all four quadrants. Now bag is lowered below so that fluid from the peritoneal cavity reenters/siphoned into the bag. Collected fluid is analysed for red cells, leukocytes, etc. (see box). DPL may not be

Diagnostic peritoneal lavage (DPL)

Significant positive lavage:

- ◆ 10 mL of gross blood.
- ◆ Red cells more than 1,00,000/cu mm.
- ◆ WBC count more than 500/cu mm.
- ◆ Amylase more than 175 mL/dL.
- ◆ Presence of bacteria, bile, food particles, foreign body.

Indeterminate lavage:

- ◆ Red cells between 50,000 to 1,00,000/cu mm.
- ◆ WBC between 100 and 500/cu mm.

Lavage not significant:

- ◆ Red cells less than 50,000/cu mm.
- ◆ WBC less than 100/cu mm.

Strongly positive means:

- ◆ Red return solution in the bag.
- ◆ Always needs laparotomy.
- ◆ Features mentioned above.

Weakly positive means:

- ◆ Pink or just red tinged fluid.
- ◆ Laparotomy chances are 10%.
- ◆ Observation/repeat investigations/repeat DPL later.
- ◆ Retroperitoneal haematoma may be present.

Lavage negative:

- ◆ Return fluid is crystal clear.
- ◆ No need of laparotomy here. Patient is observed.

False positive:

- ◆ Occurs when bleeding from retroperitoneum into peritoneal cavity occurs.
- ◆ It may lead into negative laparotomy.
- ◆ Abdominal wall bleeding into the peritoneal cavity can cause false positive result.

Contraindications for DPL:

- ◆ When laparotomy is indicated definitely.
- ◆ Previous laparotomy history.
- ◆ Pregnancy and obesity.

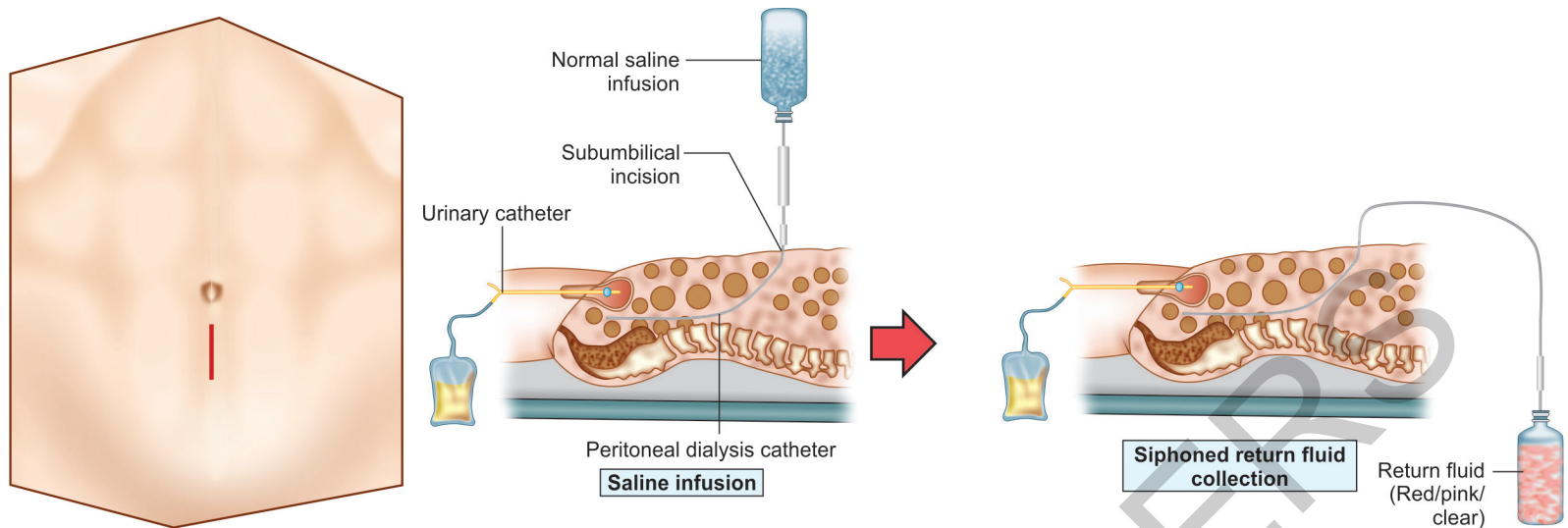


Fig. 8-20: Diagnostic peritoneal lavage—incision and technique.

useful in bowel injury, retroperitoneal injury, diaphragmatic injury, organ haematoma (subcapsular splenic haematoma). If patient is decided for observation catheter can be left in situ for repeat DPL after 6 hours. One has to remember that DPL is not a substitute for clinical assessment and monitoring. In *Lazarus-Nelson approach* Teflon catheter with a guidewire is used (**Fig. 8-20**).

CT scan of abdomen is most commonly used and better investigation for abdominal trauma. It is useful in blunt/penetrating trauma, suspected pancreas, spleen, liver, duodenal, retroperitoneal injuries. Smaller injuries, early haemoperitoneum are better detected. It is non-invasive, highly specific, highly accurate (96%), with low false positive/low false negative, non-invasive. It is very essential investigation when solid organ injuries are treated non-operatively. Three dimensional helical CT is needed to identify mesenteric or bowel injury and to find out site of injury. It is obviously not necessary to do CT when there is clear indication for immediate laparotomy. In such occasions ultrasound is more than sufficient.

Other investigations are—(1) *Abdominal diagnostic paracentesis* (Drapanas and McDonald): Here 18 G short bevel spinal needle is inserted into the peritoneal cavity after injecting local anaesthetic agent into the abdominal wall. With continuous suctioning through syringe needle is passed at various sites. Positive tap means return of minimum of 0.1 mL of non-clotted blood. False-positive result occasionally can occur due to needle puncture of abdominal wall vessels. Needle should not be inserted close to previous abdominal scar as bowel may be adherent underneath the scar. Change of direction of needle is done by withdrawing the needle tip outer to peritoneum and again puncturing the peritoneum. Puncture of non-distended bowel will seal without any leakage in 18 G needle. If there is distended bowel peritoneal tap should be avoided (**Fig. 8-21**). *Bilateral flank tap/four quadrant tap* is also done with similar result. Rectus sheath haematoma and false-negative results are problems (**Fig. 8-22**). (2) *Diagnostic laparoscopy* is very useful. It can be done under local anaesthesia. Haemoperitoneum and solid organ and diaphragmatic injuries are well assessed. But bowel and retroperitoneal injuries are more likely to be missed. (3) *Arteriography* through Seldinger technique is useful in suspected cases of renal arterial injury (thrombosis/spasm); intimal tears, traumatic aneurysm and aortic occlusion (after seat belt injury) are well diagnosed with arteriography. Often it can be therapeutic also. Pelvic bleed extending into retroperitoneum is not uncommon which can be assessed by arteriography to

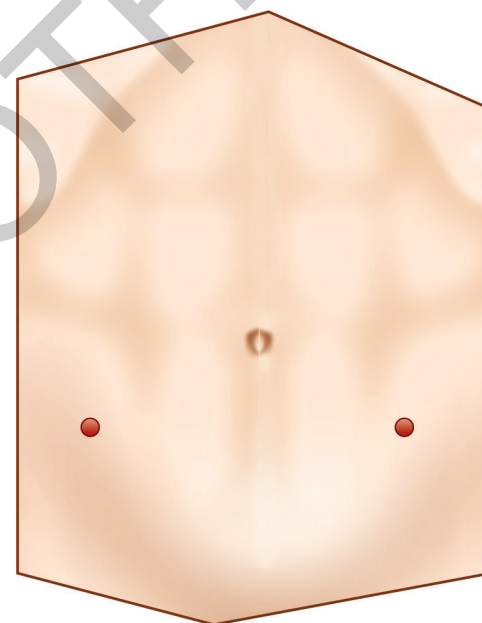


Fig. 8-21: Abdominal paracentesis.

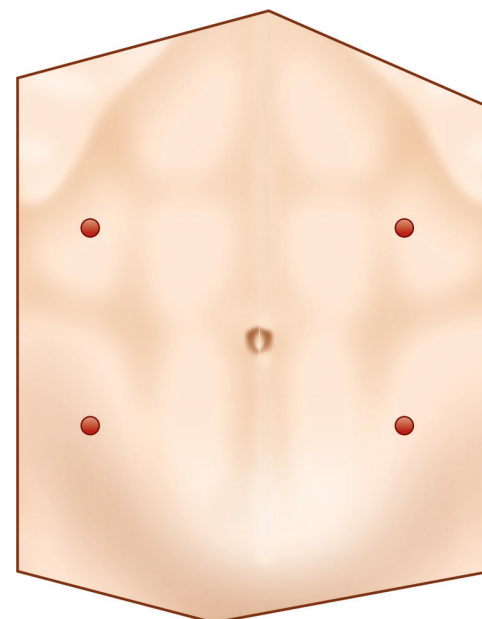


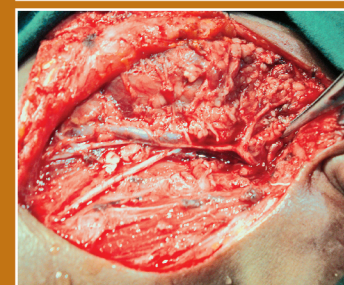
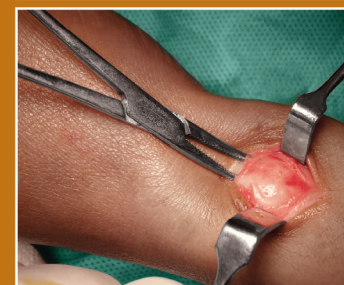
Fig. 8-22: Four quadrant aspiration of the abdomen.

SRB's SURGICAL OPERATIONS Text and Atlas

Salient Features

- Basic principle of dissection and technique of suturing is dealt with in detail
- In detail surgical anatomy in each chapter which is essential pillar of the surgical technique
- Plentiful photographs and illustrations nearly more than 8,000 of them will make the subject easily understandable
- All procedures are dealt with step by step with reasoning, precautions and difficulties at different places of technique
- Its unique presentations, detailed techniques, and plenty of photographs make this book differ from other operative surgery books
- Suturing, stapler, laparoscopy, advanced surgeries, robotics are all dealt with covering most of the surgical procedures—from simple one to complicated and current high technologies
- Newer photographs, illustrations and recent advances including current changes in surgical techniques are updated in this edition. Few new procedures like peroral endoscopic myotomy (POEM) are added also.

Sriram Bhat M MS (General Surgery) FRCS (Glasgow), Professor, Ex-HOD is currently working as Professor and Unit Head, Department of Surgery, Kasturba Medical College, Mangaluru, Karnataka, India, and Honorary Medical Officer, Government District Wenlock Hospital, Mangaluru, Dakshina Kannada, Karnataka. Hailing from a remote village from Dakshina Kannada, Karnataka, he did his MBBS from Kasturba Medical College, Mangaluru, in 1986 and MS in general surgery from the same college in 1990. He started his surgical and academic career from the surgery department, Kasturba Medical College, from 1990 onward and became professor in surgery. He has served the institution as the Head of Surgery Department for 5 years earlier. A dedicated teacher from 1990 onward with vast surgical and professional experience for the past 34 years, he is adored by all students, both undergraduates and postgraduates. He has been an unending source of motivation and mentor to many of his students throughout his career. He has written many popular books such as *SRB's Manual of Surgery*, *SRB's Clinical Methods in Surgery*, *SRB's Surgery for Dental Students*, *SRB's Atlas of Tissue Approximation*. His DigiNerve lectures through Jaypee Brothers Medical Publishers (P) Ltd, New Delhi, India, covering all surgical essential topics for both undergraduates and postgraduates with around 220 hours of lectures are extraordinary. A simple person with humility by nature, it is his love and dedication toward his profession that has made him what he is at present.



Printed in India



Available at all medical bookstores
or buy online at www.ejaypee.com



JAYPEE BROTHERS
Medical Publishers (P) Ltd.
EMCA House, 23/23-B, Ansari Road,
Daryaganj, New Delhi - 110 002, INDIA
www.jaypeebrothers.com

Join us on [facebook.com/JaypeeMedicalPublishers](https://www.facebook.com/JaypeeMedicalPublishers)
Follow us on [instagram.com/JaypeeMedicalPublishers](https://www.instagram.com/JaypeeMedicalPublishers)

Shelving Recommendation
SURGERY

ISBN 978-93-5696-956-8

