**DR RAJENDRA PRASAD GOVT. MEDICAL COLLEGE,**

**KANGRA AT TANDA**

**SURGERY — M S**

***SYLLABUS***

The following are broad syllabus and guidelines for training in general surgery and it’s allied sub specialities. The knowledge required includes the basic science relevant to each topic. Trainees, as part of their general surgical training, must acquire competence in the scheduled operations but will also have experience of other procedures from the sub-specialty departments.

**Knowledge:** The Postgraduates are required to acquire sound knowledge of following topics. The list

includes topics found in most standard surgical textbooks. The PG’s should also be familiar with recent

advances and current controversies.

1. **Applied Basic Sciences** include applied anatomy, physiology, biochemistry, microbiology ,

Pathology and medicolegal aspects of surgery..

2. **General Surgical Topics** include the following:

* History of Surgery
* Fluids and Electrolyte balance/ Acid – Base metabolism
* Wound Healing and Wound Management
* Pathophysiology and Management of Shock
* Principles of Operative Surgery: Asepsis, Sterilization and Antiseptics
* Surgical Infections and Antibiotics
* Nutrition and Metabolism
* Principles of Burn Management
* Principles of Oncology
* Principles of Laparoscopy and Endoscopy
* Haemostasis, Blood Transfusion
* Trauma: Assessment of polytrauma, triage, basic and advanced trauma
* Basic Principles of Anaesthesia
* Informed Consent and Medicolegal Issues
* Organ Transplantation
* Molecular Biology and Genetics
* Hernias: Types of hernias, repair techniques
* Breast Diseases: Benign breast disorders, investigations, screening, genetics, Breast Cancer
* Thyroid Disorders: Solitary nodule, investigations, multinodular goitre, Graves disease,

 malignancies

**PERI-OPERATIVE MANAGEMENT 1**

***Pre-operative Management***

* Assessment of fitness for anaesthesia and surgery.
* Tests of respiratory, cardiac and renal function.
* Management of associated medical conditions, eg: diabetes; respiratory disease;
* cardiovascular disease; malnutrition; anaemia; steroid, anticoagulant,
* immunosuppressant and other drug therapy.

***Infection***

* + Pathophysiology of the body’s response to infection.
	+ The sources of surgical infection - prevention and control.
	+ Surgically important micro-organisms.
	+ Principles of asepsis and antiseptic techniques.
	+ Surgical sepsis and its prevention.
	+ Antibiotic prophylaxis.

***Investigative and Operative Procedures***

* + Excision of cysts and benign tumours of skin and subcutaneous tissue.
	+ Suture and ligature materials.
	+ Basic principles of anastomosis.

***Anaesthesia***

* + Principles of anaesthesia.
	+ Pre-medication and sedation.
	+ Local and regional anaesthesia.

***Theatre Problems***

* + Surgical technique and technology.
	+ Diathermy - principles and precautions.
	+ Lasers - principles and precautions.
	+ Tourniquets - uses and precautions.
	+ Prevention of nerve and other injuries in the anaesthetised patient.
	+ Surgery in hepatitis and HIV carriers (special precautions).

***PERI-OPERATIVE MANAGEMENT 2***

***Skin and Wounds***

* + Pathophysiology of wound healing.
	+ Classification of surgical wounds.
	+ Principles of wound healing.
	+ Incisions and their closure.
	+ Scars and contracture.
	+ Wound dehiscence.

***Fluid Balance***

* + Assessment and maintenance of fluid and electrolyte balance.
	+ Nutritional support - indications, techniques, total parenteral nutrition.

***Blood***

* + Disorders of coagulation and haemostasis.
	+ Blood transfusion - indications, hazards, complications, plasma substitutes.
	+ Haemolytic disorders of surgical importance.
	+ Haemorrhagic disorders; disorders of coagulation.

***Post-operative Complications***

* + Post-operative complications - prevention, monitoring, recognition, management.
	+ Ventilatory support - indications.

***Post-operative Sequelae***

* + Pain control.
	+ Immune response to trauma, infections and tissue transplantation.
	+ Pathophysiology of the body’s response to trauma.
	+ Surgery in the immuno-compromised patient.

**TRAUMA**

***Initial Assessment and Resuscitation after Trauma***

* + Clinical assessment of the injured patient.
	+ Maintenance of airway and ventilation.
	+ Haemorrhage and shock.

***Chest, Abdomen and Pelvis***

* + Cardiorespiratory physiology as applied to trauma.
	+ Penetrating chest injuries and pneumothorax.
	+ Rib fractures and flail chest.
	+ Abdominal and pelvic injuries.

***Central Nervous System Trauma***

* + Central nervous system: anatomy and physiology
	+ Intracranial haemorrhage.
	+ Head injuries, general principles of management.
	+ Surgical aspects of meningitis.
	+ Spinal cord injury and compression.
	+ Paraplegia and quadriplegia - principles of management.

***Special Problems***

* + Pre-hospital care.
	+ Triage.
	+ Trauma scoring systems.
	+ Gunshot and blast wounds.
	+ Skin loss - grafts and flaps.
	+ Burns.

***Principles of Limb Injury***

* + Peripheral nervous system - anatomy and physiology.
	+ Fractures - pathophysiology of fracture healing.
	+ Non-union, delayed union, complications.
	+ Principles of bone grafting.
	+ Traumatic oedema, compartment and crush syndromes, fat embolism.
	+ Brachial plexus injury.

**INTENSIVE CARE**

***Cardiovascular***

* The surgical anatomy and applied physiology of the heart relevant to clinical cases.
* Physiology and pharmacological control of cardiac output, blood flow, blood pressure, and coronary

circulation.

* Cardiac arrest, resuscitation.
* Monitoring of cardiac function in the critically ill patient, central venous pressure, pulmonary wedge

pressure, tamponade, cardiac O/P measurements.

* The interpretation of special investigations.
* The management of haemorrhage and shock.
* Cardiopulmonary bypass - general principles, cardiac support.

***Respiratory***

* The surgical anatomy of the airways, chest wall, diaphragm and thoracic viscera.
* The interpretation of special investigations; lung function tests, arterial blood gases, radiology.
* The understanding of disorders of respiratory function caused by trauma, acute surgical illness and

 surgical intervention.

* Complications of thoracic operations.
* Adult respiratory distress syndrome.
* Endotracheal intubation, laryngotomy, tracheostomy.

***Multisystem Failure***

* + Multisystem failure.
	+ Renal failure - diagnosis of renal failure, complications of renal failure.
	+ GI tract and hepatic failure.

***Problems in Intensive Care***

* + - Sepsis, predisposing factors, organisms causing septicaemia.
		- Complications of thoracic operations.
		- Localised sepsis, pneumonia, lung abscess, bronchiectasis, empyema, mediastinitis.

***Principles of ICU***

* Indications for admission.
* Organisation and staffing.
* Scoring.

**NEOPLASIA: TECHNIQUES AND OUTCOME OF SURGERY**

***Principles of Oncology***

* + Epidemiology of common neoplasms and tumour-like conditions; role of cancer registries.
	+ Clinico-pathological staging of cancer.
	+ Pathology, clinical features, diagnosis and principles of management of common cancers in each of the surgical specialties.
	+ Principles of cancer treatment by surgery, radiotherapy, chemotherapy, immunotherapy and hormone therapy.
	+ The principles of carcinogenesis and the pathogenesis of cancer relevant to the clinical features, pecial investigations, staging and the principles of treatment of the common cancers.
	+ Principles of molecular biology of cancer, carcinogenesis; genetic factors; mechanisms of metastasis.

***Cancer Screening and Treatment***

* The surgical anatomy and applied physiology of the breast relevant to clinical examinations, the interpretation of special investigations, the understanding of disordered function and the principles of the surgical treatment of common disorders of the breast.
* Screening programmes.

***Techniques of Management***

* + Terminal care of cancer patients; pain relief.
	+ Rehabilitation.

***Ethics and the Law***

* + Medical/legal ethics and medico-legal aspects of surgery.
	+ Communication with patients, relatives and colleagues.

***Outcome of Surgery***

* + The evaluation of surgery and general topics.
	+ Decision-making in surgery.
	+ Clinical audit.
	+ Statistics and computing in surgery.
	+ Principles of research and design and analysis of clinical trials.
	+ Critical evaluation of innovations - technical and pharmaceutical.

**LOCOMOTOR SYSTEM**

Musculo-skeletal anatomy and physiology relevant to clinical examination of the locomotor system and

to the understanding of disordered locomotor function, with emphasis on the effects of acute musculoskeletal

trauma.

***Effects of Trauma and Lower Limb***

* + Effects of acute musculo-skeletal trauma.
	+ Common fractures and joint injuries.
	+ Common disorders of the lower limb.
	+ Amputations and prosthesis.

***Infections and Upper Limb***.

* + Infections of bones and joints (including implants and prostheses).
	+ Common disorders of the hand, including hand injuries and infections.

**VASCULAR**

The surgical anatomy and applied physiology of blood vessels relevant to clinical examination, the

interpretation of special investigations and the understanding of the role of surgery in the management of

cardiovascular disease

***Arterial Diseases***

* + Chronic obliterative arterial disease.
	+ Amputations.
	+ Aneurysms.
	+ Carotid disease.
	+ Special techniques used in the investigation of vascular disease.
	+ Limb ischaemia: acute and chronic; clinical features; gangrene; amputations for vascular disease.
	+ Principles of reconstructive arterial surgery.
	+ Atherosclerosis
	+ Principles of Angioplasty/stenting
	+ Thrombolysis
	+ Reno-vascular disease
	+ Cerebrovascular disease
	+ Vasculitis
	+ Mesenteric ischaemia
	+ Graft prosthetics
	+ Autonomic dysfunction
	+ Reperfusion injury
	+ Ischaemic limb Arterial trauma
	+ Hyper/hypo coagulable state
	+ Continuous wave doppler
	+ Duplex ultrasound

***Venous Diseases***

* + Vascular trauma and peripheral veins.
	+ Varicose veins.
	+ Venous hypertension, post-phlebitic leg, venous ulceration..
	+ Deep venous thrombosis and its complications.
	+ Chronic ulceration of the leg.
	+ Thrombosis and embolism.

***Lymphatics and Spleen***

* + Thromboembolic disease.
	+ Spleen; role of splenectomy; hypersplenism.
	+ Lymph nodes; lymphoedema.
	+ Surgical aspects of auto-immune disease.
	+ The anatomy and physiology of the haemopoeitic and lymphoreticular systems.
	+ Surgical aspects of disordered haemopoiesis.

**HEAD, NECK and ENDOCRINE**

.

***The Head***

* + Laryngeal disease; maintenance of airway; tracheostomy.
	+ Intracranial complications.
	+ Salivary gland disease.

***Neck and Endocrine Glands***

The surgical anatomy and applied physiology of the endocrine glands relevant to clinical examination,

the interpretation of special investigations, the understanding of disordered function and the principles

of the surgical treatment of common disorders of the endocrine glands.

* + Common neck swellings.
	+ Thyroid: role of surgery in diseases of the thyroid; complications of thyroidectomy; and the solitary thyroid nodule.
	+ Parathyroid; hyperparathyroidism; hypercalcaemia.
	+ Pituitary
	+ Adrenal cortex
	+ Adrenal medulla
	+ Gut as endocrine organ
	+ Endocrine pancreas and the management of:-
	+ Thyrotoxicosis
	+ Adrenal insufficiency
	+ Hyper/hypo thyroidism
	+ Carcinoid syndrome
	+ Anaesthetic and pharma-cological problems
	+ Imaging techniques
	+ Histo/cyto pathology

***Paediatric Surgical Disorders***

* + Neonatal physiology: the special problems of anaesthesia and surgery in the newborn; and the principles of neonatal fluid and electrolyte balance.
	+ Correctable congenital abnormalities.
	+ Common paediatric surgical disorders: cleft lip and palate; pyloric stenosis; intussusception; hernia; maldescent of testis; torsion; and diseases of the foreskin.
	+ Testicular pain
	+ Paediatric trauma
	+ Burns
	+ Intussusception
	+ Pyloric stenosis
	+ Hirschprung’s disease
	+ Ano-rectal anomalies
	+ Tracheo-oesophageal fistula
	+ Spina bifida
	+ Congenital small bowel obstruction
	+ Intestinal malrotation
	+ Paediatric oncology
	+ Management of less complex abdominal trauma
	+ Hydrocephalus

**ABDOMEN**

The surgical anatomy of the abdomen and its viscera and the applied physiology of the alimentary

system relevant to clinical examination, the interpretation of common special investigations, the

understanding of disorders of function, and the treatment of abdominal disease and injury.

***Abdominal Wall***

* + Anatomy of the groin, groin and other ventral hernias, acute and elective; clinical features of hernias; complications of hernias.
	+ Anterior abdominal wall, anatomy, incisions, laparoscopic access.

***Acute Abdominal Conditions***

* + Peritonitis; intra-abdominal abscesses.
	+ Common acute abdominal emergencies.
	+ Intestinal obstruction; paralytic ileus.
	+ Intestinal fistulae.
	+ Investigation of abdominal pain.
	+ Investigation of abdominal masses.
	+ Gynaecological causes of acute abdominal pain.
	+ Pelvic inflammatory disease.
	+ Assessment of the acute abdomen
	+ Appendicitis and right iliac fossa pain
	+ Peritonitis
	+ Acute intestinal obstruction
	+ Intestinal pseudo-obstruction
	+ Biliary tract emergencies
	+ Acute pancreatitis
	+ Strangulated hernia
	+ Intestinal ischaemia
	+ Swallowed foreign bodies
	+ Gastrointestinal bleeding
	+ Toxic megacolon
	+ Superficial sepsis and abscesses
	+ Acute ano-rectal sepsis
	+ Ruptured aortic aneurysm
	+ Acute presentations of urological disease
	+ Acute presentations of gynaecological disease

***Abdominal injury***

* + Assessment of the multiply injured patient
	+ Triage (major accidents)
	+ Battle triage and Field hospitals
	+ Initial management of head injuries.
	+ Closed abdominal injuries, especially splenic, hepatic and pancreatic injuries
	+ Closed chest injuries
	+ Stab and gunshot wounds
	+ Arterial injuries
	+ Injuries of the urinary tract
	+ Initial management of head injuries and interpretation of CT scans
	+ Initial management of severe burns

**SMALL BOWEL AND COLORECTAL DISORDERS**

* + Neoplasms of large bowel
	+ Inflammatory bowel disease (inc.medical management)
	+ Diverticular disease
	+ Irritable bowel syndrome
	+ Haemorrhoids
	+ Anal fissure
	+ Rectal prolapse
	+ Acute appendicitis/RIF pain
	+ Intestinal obstruction
	+ Intestinal pseudo-obstruction
	+ Intestinal ischaemia
	+ Peritonitis
	+ Large bowel and rectal injuries
	+ Anal tumours
	+ Pelvic autonomic nerves
	+ Screening for colorectal cancer
	+ Genetics of colorectal cancer
	+ Place of radiotherapy and chemotherapy in treatment
	+ Anorectal physiology
	+ Anorectal ultrasound
	+ Faecal incontinence
	+ Chronic constipation
	+ Intestinal fistulae
	+ Colonic bleeding
	+ Radiation enterocolitis
	+ Other small bowel conditions
	+ Colonic obstruction
	+ Colonic perforation ;The use of staplers

**LAPAROSCOPIC SURGERY**

* + Laparoscopic anatomy of the abdomen
	+ Diagnostic laparoscopy
	+ Physiology of pneumo-peritoneum Dangers of pneumoperitoneum
	+ Principles of diathermy
	+ Informed consent for laparo-scopic procedures
	+ Pre and post operative management of laparoscopic cases
	+ Port complications
	+ Technology of video imaging, cameras, insufflator etc.
	+ The methods of manipulation of images
	+ Laparoscopic instruments, clips, staplers and port types
	+ Management of equipment failure
	+ Ultrasound interpretation, internal and external techniques
	+ Recognition and management of laparoscopic complications
	+ Use and dangers of diathermy
	+ Anaesthetic problems in laparoscopic surgery
	+ Medico-legal implications of video-endoscopic surgery
	+ Theory and pracice of choledocho-scopy
	+ Theory of different forms of diathermy
	+ Laparoscopic ultrasound
	+ Advanced instrumentation and equipment
	+ Endoscopic suturing devices
	+ Theory, uses and dangers of lasers and other energy sources e.g. harmonic scalpel
	+ Creation and maintenance of new endoscopic spaces
	+ Use of assistance robots and robotic instruments

**TRANSPLANTATION withspecial reference to RENAL AND HEPATIC**

**DISEASE**

* + Pathology of renal and hepatic disease
	+ Patho-physiology of renal and hepatic failure
	+ Peritoneal- and haemo-dialysis
	+ Management of fluid and electrolyte disorders
	+ Selection of patients for transplantation
	+ Post-operative management
	+ Immuno-pathology of rejection
	+ Management of rejection
	+ Immunosuppression
	+ Opportunist infections
	+ Immunosuppression and cancer
	+ Transmission of viral and fungal diseases
	+ Tissue typing
	+ The HLA system
	+ Bladder dysfunction

**HEPATOPANCREATOBILIARY SURGERY**

* + Gallstones and complications
	+ Biliary stricture
	+ Obstructive Jaundice
	+ Neoplasms of the Liver, Biliary Tract and Pancreas
	+ Pancreatitis, acute and chronic, complications
	+ Liver injuries
	+ Portal Hypertension
	+ Hydatid disease
	+ ESRD and Liver transplatation

**UPPER GI TRACT**

* + Neoplasms of the upper GI tract
	+ Management of perforations of the upper GI tract
	+ Management of intestinal obstruction
	+ Management of GI bleeding
	+ Oesophageal motility disorders
	+ Oesophageal Strictures
	+ Gastro-oesophageal reflux and its complications
	+ Peptic ulceration and its complications
	+ Radiation enteritis
	+ Abdominal trauma
	+ Principles of screening for cancer
	+ The use and limitations of multimodality treatment for upper GI cancer
	+ Oesophageal motility disorders
	+ Other small bowel conditions
	+ Principles of Small bowel resection
	+ Sutured and stapled anastomoses
	+ Urinary Tract
	+ Urinary tract infection.
	+ Urinary Tract Obstruction
	+ Haematuria.
	+ Trauma to the urinary tract.
	+ Urinary calculi.
	+ Retention of urine.
	+ Urinary tract Neoplasms
	+ Disorders of prostate.
	+ Pain and swelling in the scrotum.
	+ Other Scrotal Lesions
	+ Testicular Neoplasms

**NEUROSURGERY**

* + Cranial, spinal and peripheral nerve tumours
	+ Head Injury
	+ Spinal and peripheral nerve injuries
	+ Hydrocephalus
	+ Cerebrovascular Accidents
	+ Infections
	+ Recent advances

***Cardiac and Thoracic Surgery***

* + Myocardial revascularisation
	+ Valvular Disorders
	+ Peripheral vascular disease
	+ Renovascular disease
	+ Secondary Hypertension
	+ Inflammatory Lung Disease
	+ Chest Wall lesions
	+ Thoracic Neoplastic Disease
	+ Chest Trauma
	+ Pleural Diseases

***Orthopaedics***

* + Principles of Orthopaedic Trauma
	+ Casts and braces
	+ Nerve injuries
	+ Hand Infections
	+ Principles of Traction
	+ Amputations
	+ Principles of Rehabilitation
	+ Congenital Lesions
	+ Bone and Joint Infections

**SKILLS**

***Objectives***

* To provide a comprehensive and structured training programme in general surgery and to enable
* trainees to achieve the training and experience necessary for independent practice.
* The PG should be able to take proper history, conduct physical examination, perform or request for
* relevant investigations. He should be able to interpret these investigations to arrive at a working
* diagnosis.
* Communicate with patient. Discuss operative plan, possible management options, postoperative
* complications etc and be able to take informed consent
* Perform minor operative procedures and common major general surgical operations independently
* Evaluate and manage trauma and acute surgical emergencies.
* Undertake Critical care
* Undertake wound management

***Basic Ward Procedures***

* + Insertion of intravenous cannula, Nasogastric tube, urinary catheters
	+ Removal of Tubes and Drains
	+ Abdominal Paracentesis, Pleural Tap
	+ Venous Cutdown
	+ Wound dressings

***ICU Procedures***

* + Insertion of CVP line, arterial lines, endotracheal intubation
	+ Intercostal Drainage
	+ Tracheostomy
	+ Knowledge of Ventilators and Monitors
	+ Prescribing TPN

***Minor Surgical Procedures***

* Hydrocele surgery, Lymph node biopsy, Excision of superficial swellings, Ingrowing toe nail,
* Circumcision, Banding of Haemrrhoids, Vasectomy

***Emergency Room Procedures***

* Diagnostic peritoneal lavage (DPL)
* Suturing of lacerations
* Drainage of abscesses
* Wound Debridement
* Reduction and Plaster application of simple fractures and dislocations
* Anal Dilatation and Sphincterotomy
* Preoperative Workup and Postoperative Care

***Major Operative Procedures***

**A) Perform Independently/ Assistance:**

The following list is not exhaustive. The Trainee should try to get the maximal operative exposure

possible. The range of exposure will also depend upon the type of surgeries a particular unit (where the

Trainee is posted) is performing.

**Routine:** Open and laparoscopic Cholecystectomy, Groin Hernia Repair, Mastectomy, Breast Lump

Excision, microdochectomy, Radical Duct Excision, Hemithyroidectomy, Laparotomy, Diagnostic

laparoscopy, Thoracotomy, Cystogastrostomy, Suprapubic cystostomy, Hemicolectomy, Cysts and

Sinuses of the Neck, Gastrostomy and feeding jejunostomy, Nephrectomy, Pyelolithotomy,

Ureterolithotomy, Orchidopexy, Skin grafting, Varicose vein surgery, vein harvesting, Lumbar

Sympathectomy, Small bowel resection, Femoral herniorrhaphy, Umbilical and para umbilical hernia

repair, Incisional and para-stomal hernia repair

**Emergency:** Appendectomy, Laparotomy for intestinal Obstruction, Trauma Laparotomy, Splenectomy,

Closure of Peptic Ulcer Perforation, Enteric Perforation, Resection-Anastamosis of bowel, Colostomy,

Hemicolectomy, Amputations, Embolectomy, Tracheostomy, Obstructed Inguinal Hernia

**B) Assist/Observe**

**Vascular**

• Reconstructive arterial surgery.

• Aneurysm Surgery

**HEAD, NECK, ENDOCRINE AND PAEDIATRIC**

***The Head***

• Parotidectomy, submandibular gland excision

***Neck and Endocrine Glands***

• Thyroidectomy, parathyroidectomy, congenital or developmental problems

• Adrenalectomy

• Surgery for endocrine pancreatic tumours

***Paediatric Disorders***

• Common paediatric surgical disorders: cleft lip and palate; pyloric stenosis; intussusception; hernia;

maldescent of testis; torsion; and diseases of the foreskin.

**ABDOMEN**

• Sub-total colectomy

• Diagnostic laparoscopy

• Gastrectomy for bleeding

• Endoscopy for upper GI obstruction

• Laparotomy for perforated colon

• Suture of bleeding peptic ulcer

• Emergency cholecystectomy

• Exploration of scrotum for torsion

• Emergency hernia repair

• Laparotomy for abdominal

• Reduction of paraphimosis

• Laparotomy for small bowel injury

• Diagnostic peritoneal lavage

• Intestinal obstruction

• Splenic repair

• Hartmann’s operation

• Operation for ruptured liver

• Pancreatic debridement

• Median sternotomy

***Reconstructive Surgery***

• Myocutaneous flaps

• Tissue expanders

• Breast reduction

***Colorectal***

• Therapeutic Endoscopy, colonoscopy

• Anterior resection of rectum

• AP resection of rectum

• Ileorectal anastomosis

• Panproctocolectomy

• Closure of Hartmann’s

• Prolapse surgery

• Incontinence surgery

• Sphincter repair

• Recto-vaginal fistula

• Ileo-anal and colonic pouch

• Colo-anal anastomosis

• Operation for intestinal fistula

• Complex fistula-in-ano

• Posterior approach to rectum

• Block dissection of groin

• Operative cholangiography

• Laparoscopic suturing and knotting

• Nephrectomy

• Pyelo and ureterolithotomy

• Pyeloplasty

• Open prostatectomy

***Laparotomy for acute abdomen***

• Splenectomy

• Operations for upper GI bleeding

• Exploration of common bile duct

• Biliary bypass

• Formation of Roux-en-Y loop

• Oesophagectomy/total gastrectomy

• Pancreatectomy

• Liver resection

• Oesophagectomy

• Total and subtotal

• gastrectomy

• Heller’s myotomy

• Long oesophageal myotomy

• Pharyngeal pouch

• Repair of biliary stricture

• Whipple’s procedure

• Pancreatectomy (distal and total)

• Drainage of infected pancreatitis

• Drainage of pancreatic pseudo-cyst

• Liver injuries

• Hydatid disease

• Porto-systemic shunt

• Vascular suture/anastomosis

• Control of venous bleeding

• Balloon thrombo-embolectomy

• Fasciotomy

• Artenal injuries

• Vascular access for dialysis

* **Recent advances**
* **Current controversies in surgery.**