# Preoperative Investigations of Neurosurgery

General Preoperative Checks  
• Check consciousness, speech, memory, movement, and nerves.  
• Blood pressure measurement (baseline).  
• Heart check: Electrocardiogram (ECG – electrical tracing of the heart), Echocardiogram (ultrasound scan of the heart).  
• Lung check: Chest X-ray, Pulmonary Function Tests (spirometry – breathing tests), Arterial Blood Gas test (oxygen test).  
• Airway check: Look at mouth opening and neck movement to assess easy or difficult intubation.  
• Blood sugar check (goal 100–150 mg/dL).  
• Kidney blood tests: Serum Creatinine, Blood Urea Nitrogen (BUN), and Glomerular Filtration Rate (GFR).  
• Liver blood tests: Liver Function Tests (LFTs – including ALT, AST, Bilirubin, Alkaline Phosphatase).  
• Blood count: Complete Blood Count (CBC – hemoglobin, hematocrit, white blood cells, platelets). Cross-match blood if major surgery planned.  
• Brain scans: Computed Tomography (CT), Magnetic Resonance Imaging (MRI), Angiography (blood vessel imaging).  
  
Pituitary Tumor Patients  
• Blood hormone levels: Prolactin, Adrenocorticotropic Hormone (ACTH), Growth Hormone (GH), Follicle-Stimulating Hormone (FSH), Luteinizing Hormone (LH), Thyroid Stimulating Hormone (TSH).  
• Salt and water balance tests to detect Diabetes Insipidus or Syndrome of Inappropriate Antidiuretic Hormone secretion (SIADH).  
  
Posterior Fossa Surgery  
• Check for patent foramen ovale (hole in the heart) with Echocardiography or Doppler ultrasound.  
  
Cerebral Aneurysm / Bleeding  
• Brain function grading: Glasgow Coma Scale (GCS) and World Federation of Neurosurgical Societies (WFNS) Scale.  
• Heart check: Electrocardiogram (ECG), Troponin blood test (heart enzyme), Echocardiogram.  
• Electrolytes: Sodium, Potassium, Calcium, Magnesium.  
• Brain imaging: CT, MRI, Angiography.  
  
Carotid Artery Narrowing  
• Neck artery scan: Doppler ultrasound, CT angiography, or MRI angiography.  
• Cardiac check: angina, arrhythmias, heart failure.  
• Blood sugar control (important in stroke patients).  
  
Interventional Neuroradiology  
• Kidney function tests: Serum Creatinine, Glomerular Filtration Rate (GFR).  
• Allergy history to contrast dye.  
• Blood clotting tests: Prothrombin Time (PT), Activated Partial Thromboplastin Time (aPTT), International Normalized Ratio (INR).  
• Pregnancy test (for women of childbearing age).  
  
Functional Neurosurgery (Deep Brain Stimulation for Parkinson’s disease)  
• Brain MRI for planning surgery.  
• Cognitive and psychiatric evaluation.  
• System check in Parkinson’s disease: Heart (ECG, Echocardiogram), Lungs (Chest X-ray, Pulmonary Function Tests), Blood sugar tests, Nutritional blood tests.  
  
Epilepsy Surgery  
• Electroencephalogram (EEG – brain wave recording).  
• Brain scans: MRI, CT, Functional Neuroimaging (e.g., PET or SPECT).  
• Psychiatric evaluation.  
• Antiepileptic drug level tests if required.

Glasgow Coma Scale (GCS)  
  
Parameter Response Score  
Eye Opening Spontaneous 4  
 To speech 3  
 To pain 2  
 None 1  
  
Verbal Response Oriented 5  
 Confused 4  
 Inappropriate words 3  
 Incomprehensible sounds 2  
 None 1  
  
Motor Response Obeys commands 6  
 Localizes pain 5  
 Withdraws from pain 4  
 Flexion to pain (decorticate) 3  
 Extension to pain (decerebrate) 2  
 None 1  
  
  
WFNS Scale for Subarachnoid Hemorrhage  
  
Grade GCS Deficit  
I 15 None  
II 13–14 None  
III 13–14 With deficit  
IV 7–12 With/without deficit  
V 3–6 With/without deficit  
  
  
Diabetes Insipidus vs SIADH  
  
Feature Diabetes Insipidus SIADH  
Presentation Polyuria, excessive thirst Hyponatremia, water retention  
Serum Sodium High (>145 mEq/L) Low (<135 mEq/L)  
Serum Osmolality High (>310 mOsm/L) Low (<275 mOsm/L)  
Urine Volume Increased (>4 L/day) Decreased (low volume)  
Treatment Fluids + Desmopressin (DDAVP) Fluid restriction, hypertonic saline if Na <120  
  
  
STOP-BANG Questionnaire for Obstructive Sleep Apnea (OSA) Screening  
  
Letter Question Answer (Yes = 1, No = 0)  
S Do you Snore loudly?  
T Do you often feel Tired during the day?  
O Has anyone Observed you stop breathing during sleep?  
P Do you have high Blood Pressure?  
B Is your Body Mass Index (BMI) > 35 kg/m²?  
A Are you Age > 50 years?  
N Is your Neck circumference > 40 cm?  
G Gender = Male?  
  
Scoring:  
0–2 = Low risk of OSA  
3–4 = Intermediate risk of OSA  
5–8 = High risk of OSA  
  
Reference: Sivanaser et al., 2010 Mar; doi: 10.1155/2010/241307