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HANDBOOK OF INTERVENTIONAL RADILOGIC PROCEDURES

5TH EDITION
“Dedicated to the innovative spirit of interventional radiologists.”
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**Appendix E**: Computed Tomographic Angiography Protocols
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**Appendix F**: Contrast Media Table
Michael A. Bettmann
The field of interventional radiology continues to grow and to change. The scope of care provided by this critical medical discipline has advanced rapidly over the quarter of a century since the very first edition of this Handbook in 1989. There are few other disciplines that have changed so much in this brief amount of time. The scope of this change is represented by the table of contents that has expanded to over 100 chapters, and more important, the Handbook continues to emphasize not only procedures that have been described in previous editions but also the important expanding roles of endovascular and nonvascular interventional therapies for a multitude of disease states. Reflecting changes in the health care system, important chapters on quality assurance and improvement, risk management, as well as safety—including radiation and infection control—have been included.

More important, discussions on the clinical practice of interventional radiology are addressed, including organizational and operational issues, nursing management, and the practical use and management of pharmacologic therapies.

It is hard to imagine how the Handbook of Interventional Radiologic Procedures could possibly improve over prior editions. Since its initial publication, this Handbook has become an essential reference for interventionists at all levels of experience. It will undoubtedly be essential for residents and fellows during their training and should remain an important reference for practitioners who will benefit from the valuable practical information contained in this volume.

The field of interventional radiology continues to evolve as both a clinical and a procedural discipline. The challenges of creating a comprehensive handbook of practical information in a volume that can actually be carried around has become more difficult. Yet the editors and authors have amassed a volume that is brisk and focused in style, extremely well organized and catalogued to make it easy for the reader to get critical information when necessary in the treatment of specific patients. This handbook is a tool in the hands of interventionists which is as helpful as any of the devices that may be used in specific procedures. In keeping with the times, an updated electronic version for handheld devices is once again provided.

I’m certain that the fifth edition of the Handbook of Interventional Radiologic Procedures will become an indispensable tool and resource in the lab coat of all interventional radiologists and staff performing these procedures. I know it will for me.

Barry T. Katzen, MD
PREFACE

From inability to let well alone; from too much zeal for the new and contempt for what is old; from putting knowledge before wisdom, science before art, and cleverness before common sense, from treating patients as cases, and from making the cure of the disease more grievous than the endurance of the same, Good Lord, deliver us.

Sir Robert Hutchinson

Correspondence regarding modern treatment in the British Medical Journal, March 12, 1953, p. 671.

Interventional radiology remains a vibrant field with evolving and rapidly growing applications due in large part of the ingenuity and creativity of its practitioners. Although it is true that medical necessity may have mothered many inventions, scientific advances and competitive pressures have also done much to motivate this innovational spirit. Future success will depend not only on a continued proactive “innovational” attitude but, more importantly, also on embracing the clinical management of patients, and staying ahead of unrelenting competition. Fortunately, the pace of innovations and the specialty’s acquisition of clinical management skills have necessitated a fifth edition of Handbook of Interventional Radiologic Procedures.

This book should be useful not only for practicing interventional radiologists but also for fellows and residents in training, and for those seasoned general radiologists who are several years out from formal training but have retained the skills required for performing interventional procedures. This book will also help interventional nurses and special procedure technologists in performing their own vital tasks more efficiently by enhancing medical knowledge specific to each procedure.

We realize that there is no single way to perform a procedure and do not mean to imply that the descriptions here are the only appropriate ones. The intent is to provide a framework that the interventionalist can use and build on as more experience is gained. As in prior editions, each chapter on procedures has been organized in a consistent outline format to facilitate easy access to specific sections on indications and contraindications, proprocedure preparation, procedural protocol, postprocedure care, and expected outcomes—all toward improving patient safety by preventing complications or managing them appropriately when they do occur. This latter information is especially useful while the procedure is being discussed with the patient before obtaining informed consent. We have—to the best of our ability—corrected mistakes and oversights from prior editions.

We are eternally grateful to the contributors worldwide for their painstaking efforts in creating what we hope will be another successful handbook. We thank Dr. Barry Katzen for kindly writing the foreword. We thank Ryan Shaw and Rebeca Barroso of Wolters Kluwer for guiding us through the process, and most of all for their patience.

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ABBREVIATIONS

18F-FDG  18F-fluorodeoxyglucose
2D      Two-dimensional
3D      Three-dimensional
A       Ankle
AAA     Abdominal aortic aneurysm
AASLD   American Association for the Study of Liver Diseases
ABI     Ankle-brachial index
ACA     Anterior cerebral artery
ACAS    Asymptomatic Carotid Atherosclerosis Trial
ACD     Advance care directives
ACE     Angiotensin-converting enzyme
ACLS    Advanced cardiac life support
ACR     American College of Radiology
ACT     Activated clotting time
ADC     Analog-to-digital converter
ADH     Antidiuretic hormone
ADP     Adenosine diphosphate
AE      Adverse events
AECD    Automatic external cardioverter-defibrillator
AF      Atrial fibrillation
AFB     Acid-fast bacilli
AFP     α-Fetoprotein
AGIH    Acute gastrointestinal hemorrhage
AHRQ    Agency for Healthcare Research and Quality
AK      Above-knee
ALS     Amyotrophic lateral sclerosis
AMFPI   Active matrix flat-panel imager
AMI     Acute mesenteric ischemia
AML     Angiomyolipoma
Ao      Aorta
AP      Anteroposterior
APD     All-purpose drainage
APF     Arterioporal fistula
APTT    Activated partial thromboplastin time
ARDS    Adult respiratory distress syndrome
ARNP    Advanced registered nurse practitioner
ASA     Acetylsalicylic acid
ASA     American Society of Anesthesiologists
ASD     Atrial septal defect
ASPECTS Alberta Stroke Program early computed tomography scan
AT      Anterior tibial
<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
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<tbody>
<tr>
<td>ATIII</td>
<td>Antithrombin III</td>
</tr>
<tr>
<td>ATM</td>
<td>Atmospheres</td>
</tr>
<tr>
<td>AV</td>
<td>Arteriovenous</td>
</tr>
<tr>
<td>A-V</td>
<td>Atrioventricular</td>
</tr>
<tr>
<td>AVF</td>
<td>Arteriovenous fistula</td>
</tr>
<tr>
<td>AVG</td>
<td>Arteriovenous graft</td>
</tr>
<tr>
<td>AVM</td>
<td>Arteriovenous malformation</td>
</tr>
<tr>
<td>AVP</td>
<td>Amplatzer Vascular Plug</td>
</tr>
<tr>
<td>BAC</td>
<td>Bronchioloalveolar carcinoma</td>
</tr>
<tr>
<td>BAE</td>
<td>Bronchial artery embolization</td>
</tr>
<tr>
<td>BCLC</td>
<td>Barcelona Clinic Liver Cancer</td>
</tr>
<tr>
<td>BE</td>
<td>Balloon expandable</td>
</tr>
<tr>
<td>β hCG</td>
<td>Beta human chorionic gonadotropin hormone</td>
</tr>
<tr>
<td>BGC</td>
<td>Balloon-guiding catheter</td>
</tr>
<tr>
<td>bid</td>
<td>Two times per day</td>
</tr>
<tr>
<td>BIPAP</td>
<td>Bi-level positive airway pressure</td>
</tr>
<tr>
<td>BLS</td>
<td>Basic life support</td>
</tr>
<tr>
<td>BMI</td>
<td>Body mass index</td>
</tr>
<tr>
<td>BMS</td>
<td>Bare-metal stents</td>
</tr>
<tr>
<td>BMT</td>
<td>Bone marrow transplant</td>
</tr>
<tr>
<td>BOT</td>
<td>Balloon occlusion tolerance</td>
</tr>
<tr>
<td>BP</td>
<td>Blood pressure</td>
</tr>
<tr>
<td>BPH</td>
<td>Benign prostatic hyperplasia</td>
</tr>
<tr>
<td>BRTO</td>
<td>Balloon-occluded retrograde transvenous obliteration</td>
</tr>
<tr>
<td>BTK</td>
<td>Below-the-knee</td>
</tr>
<tr>
<td>BUN</td>
<td>Blood urea nitrogen</td>
</tr>
<tr>
<td>BW</td>
<td>Bandwidth</td>
</tr>
<tr>
<td>CABG</td>
<td>Coronary artery bypass graft</td>
</tr>
<tr>
<td>CAD</td>
<td>Coronary artery disease</td>
</tr>
<tr>
<td>CAS</td>
<td>Carotid artery stenting</td>
</tr>
<tr>
<td>CASH</td>
<td>Chemotherapy-associated steatohepatitis</td>
</tr>
<tr>
<td>CAVATAS</td>
<td>Carotid and Vertebral Artery Transluminal Angioplasty Study</td>
</tr>
<tr>
<td>CaVenT</td>
<td>Catheter-directed Venous Thrombolysis</td>
</tr>
<tr>
<td>CBC</td>
<td>Complete blood count</td>
</tr>
<tr>
<td>CBCT</td>
<td>Cone-beam computed tomography</td>
</tr>
<tr>
<td>CBF</td>
<td>Cerebral blood flow</td>
</tr>
<tr>
<td>CBV</td>
<td>Cerebral blood volume</td>
</tr>
<tr>
<td>CC</td>
<td>Cisterna chyli</td>
</tr>
<tr>
<td>CCA</td>
<td>Common carotid artery</td>
</tr>
<tr>
<td>CCD</td>
<td>Charge-coupled device</td>
</tr>
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<td>CCS</td>
<td>Canadian Cardiovascular Society</td>
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<tr>
<td>CDC</td>
<td>Centers for Disease Control and Prevention</td>
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<tr>
<td>CDT</td>
<td>Catheter-directed thrombolysis</td>
</tr>
<tr>
<td>CEA</td>
<td>Carcinoembryonic antigen; carotid endarterectomy</td>
</tr>
<tr>
<td>CFA</td>
<td>Common femoral artery</td>
</tr>
<tr>
<td>CFV</td>
<td>Common femoral vein</td>
</tr>
<tr>
<td>CHA</td>
<td>Common hepatic artery</td>
</tr>
<tr>
<td>CHF</td>
<td>Congestive heart failure</td>
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<tr>
<td>Abbreviation</td>
<td>Full Form</td>
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<tr>
<td>CIA</td>
<td>Common iliac artery</td>
</tr>
<tr>
<td>CIN</td>
<td>Contrast-induced nephropathy</td>
</tr>
<tr>
<td>CIWA</td>
<td>Clinical Institute Withdrawal Assessment</td>
</tr>
<tr>
<td>CKD</td>
<td>Chronic kidney disease</td>
</tr>
<tr>
<td>CLABSI</td>
<td>Central line-associated bloodstream infection</td>
</tr>
<tr>
<td>CLI</td>
<td>Critical limb ischemia</td>
</tr>
<tr>
<td>CMS</td>
<td>Centers for Medicare and Medicaid Services</td>
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<tr>
<td>CNS</td>
<td>Central nervous system</td>
</tr>
<tr>
<td>COPD</td>
<td>Chronic obstructive pulmonary disease</td>
</tr>
<tr>
<td>COX</td>
<td>Cyclooxgenase</td>
</tr>
<tr>
<td>CP</td>
<td>Cerebral protection</td>
</tr>
<tr>
<td>CPAP</td>
<td>Continuous positive airway pressure</td>
</tr>
<tr>
<td>CPAS</td>
<td>Congenital pulmonary artery stenosis</td>
</tr>
<tr>
<td>CPOE</td>
<td>Computerized physician order entry</td>
</tr>
<tr>
<td>CPR</td>
<td>Cardiopulmonary resuscitation</td>
</tr>
<tr>
<td>CPRF</td>
<td>Curved planar reformats</td>
</tr>
<tr>
<td>CPT</td>
<td>Current Procedural Terminology</td>
</tr>
<tr>
<td>Cr</td>
<td>Creatinine (serum)</td>
</tr>
<tr>
<td>CQI</td>
<td>Continuous quality improvement</td>
</tr>
<tr>
<td>CR-BSI</td>
<td>Catheter-related bloodstream infections</td>
</tr>
<tr>
<td>CRC</td>
<td>Colorectal cancer</td>
</tr>
<tr>
<td>CREST</td>
<td>Carotid Revascularization Endarterectomy versus Stenting Trial</td>
</tr>
<tr>
<td>CRP</td>
<td>C-reactive protein</td>
</tr>
<tr>
<td>CSF</td>
<td>Cerebrospinal fluid</td>
</tr>
<tr>
<td>CsI</td>
<td>Cesium iodide</td>
</tr>
<tr>
<td>CT</td>
<td>Computed tomography</td>
</tr>
<tr>
<td>CTA</td>
<td>Computed tomographic angiography</td>
</tr>
<tr>
<td>cTACE</td>
<td>Conventional transarterial chemoembolization</td>
</tr>
<tr>
<td>CTO</td>
<td>Chronic total occlusion</td>
</tr>
<tr>
<td>CTP</td>
<td>CT perfusion</td>
</tr>
<tr>
<td>CTV</td>
<td>Computed tomography venography</td>
</tr>
<tr>
<td>CV</td>
<td>Central venous</td>
</tr>
<tr>
<td>CVA</td>
<td>Cerebral vascular accident</td>
</tr>
<tr>
<td>CVC</td>
<td>Central venous catheter</td>
</tr>
<tr>
<td>CVD</td>
<td>Chronic venous disease</td>
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<tr>
<td>CXR</td>
<td>Chest radiograph; chest xray</td>
</tr>
<tr>
<td>D5½NS</td>
<td>5% dextrose, half-normal saline solution</td>
</tr>
<tr>
<td>D5W</td>
<td>5% Dextrose solution</td>
</tr>
<tr>
<td>DAP</td>
<td>Dose–area product</td>
</tr>
<tr>
<td>DAVF</td>
<td>Dural arteriovenous fistula</td>
</tr>
<tr>
<td>DCI</td>
<td>Delayed cerebral ischemia</td>
</tr>
<tr>
<td>DEB</td>
<td>Drug-eluting bead; drug-eluting balloon</td>
</tr>
<tr>
<td>DER</td>
<td>Dual energy radiography</td>
</tr>
<tr>
<td>DES</td>
<td>Drug-eluting stent</td>
</tr>
<tr>
<td>DH</td>
<td>Degree of hypertrophy</td>
</tr>
<tr>
<td>DIC</td>
<td>Disseminated intravascular coagulopathy</td>
</tr>
<tr>
<td>DICOM</td>
<td>Digital imaging and communication in medicine</td>
</tr>
<tr>
<td>DIPS</td>
<td>Direct intrahepatic portosystemic shunt</td>
</tr>
<tr>
<td>Abbreviation</td>
<td>Description</td>
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<td>--------------</td>
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<tr>
<td>IFU</td>
<td>Instructions for use</td>
</tr>
<tr>
<td>IHI</td>
<td>Institute for Healthcare Improvement</td>
</tr>
<tr>
<td>IHSS</td>
<td>Idiopathic hypertrophic subaortic stenosis</td>
</tr>
<tr>
<td>II</td>
<td>Image intensifier</td>
</tr>
<tr>
<td>IIA</td>
<td>Internal iliac artery</td>
</tr>
<tr>
<td>IIEF</td>
<td>International Index of Erectile Function</td>
</tr>
<tr>
<td>IJ</td>
<td>Internal jugular</td>
</tr>
<tr>
<td>IJV</td>
<td>Internal jugular vein</td>
</tr>
<tr>
<td>IM</td>
<td>Intramuscular</td>
</tr>
<tr>
<td>IMA</td>
<td>Inferior mesenteric artery; internal mammary artery</td>
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<tr>
<td>IMS III</td>
<td>Interventional Management of Stroke III</td>
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<tr>
<td>IMV</td>
<td>Inferior mesenteric vein</td>
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<tr>
<td>INR</td>
<td>International normalized ratio</td>
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<tr>
<td>IO</td>
<td>Interventional oncology</td>
</tr>
<tr>
<td>IOM</td>
<td>Institute of Medicine</td>
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<tr>
<td>IPSS</td>
<td>International Prostate Symptom Score</td>
</tr>
<tr>
<td>IQR</td>
<td>Interquartile range</td>
</tr>
<tr>
<td>IR</td>
<td>Interventional radiology; interventional radiologist</td>
</tr>
<tr>
<td>IRE</td>
<td>Irreversible electroporation</td>
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<tr>
<td>ISAT</td>
<td>International Subarachnoid Aneurysm Trial</td>
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<tr>
<td>ISV</td>
<td>Internal spermatic vein</td>
</tr>
<tr>
<td>ITT</td>
<td>Intention to treat</td>
</tr>
<tr>
<td>IV</td>
<td>Intravenous; intravenously</td>
</tr>
<tr>
<td>IVA</td>
<td>Inferior vesical artery</td>
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<tr>
<td>IVC</td>
<td>Inferior vena cava</td>
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<tr>
<td>IVUS</td>
<td>Intravascular ultrasound</td>
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<tr>
<td>J-tube</td>
<td>Jejunostomy</td>
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<tr>
<td>KAP</td>
<td>Kerma–area product</td>
</tr>
<tr>
<td>KGR</td>
<td>Kinetic growth rate</td>
</tr>
<tr>
<td>KP</td>
<td>Kyphoplasty</td>
</tr>
<tr>
<td>K-RAS</td>
<td>Kirsten Rat Sarcoma Viral Oncogene Homolog</td>
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<tr>
<td>KTS</td>
<td>Klippel–Trenaunay syndrome</td>
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<tr>
<td>kVp</td>
<td>Kilovolt peak</td>
</tr>
<tr>
<td>KVO</td>
<td>Keep vein open</td>
</tr>
<tr>
<td>LA</td>
<td>Left atrial; left atrium</td>
</tr>
<tr>
<td>LAD</td>
<td>Left anterior descending</td>
</tr>
<tr>
<td>LAO</td>
<td>Left anterior oblique</td>
</tr>
<tr>
<td>LCD</td>
<td>Liquid crystal display</td>
</tr>
<tr>
<td>LDCT</td>
<td>Low-dose CT</td>
</tr>
<tr>
<td>LDH</td>
<td>Lactate dehydrogenase</td>
</tr>
<tr>
<td>LDL</td>
<td>Low-density lipoprotein</td>
</tr>
<tr>
<td>LFT</td>
<td>Liver function test</td>
</tr>
<tr>
<td>LGIB</td>
<td>Lower GI bleeding</td>
</tr>
<tr>
<td>LM</td>
<td>Lymphatic malformations</td>
</tr>
<tr>
<td>LMA</td>
<td>Laryngeal mask airway</td>
</tr>
<tr>
<td>LMWH</td>
<td>Low-molecular-weight heparin</td>
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<tr>
<td>LOCA</td>
<td>Low-osmolality contrast agents</td>
</tr>
<tr>
<td>LOCM</td>
<td>Low osmolar contrast medium</td>
</tr>
</tbody>
</table>
LSCA  Left subclavian artery
LSF   Lung shunt fraction
LSN   Last seen normal
LUTS  Lower urinary tract symptoms
LV    Left ventricle; left ventricular
LVEDP Left ventricular end-diastolic pressure
LVEDV Left ventricular end-diastolic volume
LVO   Large vessel occlusion
MAA   Macroaggregated albumin
MAC   Monitored anesthesia care
MAO   Monoamine oxidase
MAP   Mean arterial pressure
MBB   Medial branch block
MC    Manual compression
MCA   Middle cerebral artery
mCRC  Metastatic colon cancer
mCTA  Multiphase CTA
MD    Medical doctor
MI    Myocardial infarction
MIP   Maximum intensity projection
MODS  Multiple organ dysfunction syndrome
MPA   Multipurpose shape
MPR   Multiplanar reformations
MR    Magnetic resonance
MRA   Magnetic resonance angiography
MR CLEAN Multicenter Randomized Clinical Trial of Endovascular Treatment for Acute Ischemic Stroke in the Netherlands
MRCP  Magnetic resonance cholangiopancreatography
MRDSA Magnetic resonance digital subtraction angiography
mRECIST Modified Response Evaluation Criteria in Solid Tumors
MR RESCUE Mechanical Retrieval and Recanalization of Stroke Clots Using Embolectomy
MRI   Magnetic resonance imaging
MRV   Magnetic resonance venogram; magnetic resonance venography
mTICI  Modified thrombolysis in cerebral infarction
MTT   Mean transit time
MWA   Microwave ablation
nAC   $n$-Acetyl cysteine
NaHCO$_3$ Sodium bicarbonate
NASCET North American Symptomatic Carotid Endarterectomy Trial
nBCA  $n$-Butyl cyanoacrylate
NCCT  Noncontrast computed tomography
NG    Nasogastric
NG-tube Nasogastric tube
NIH   National Institutes of Health
NIHSS National Institutes of Health Stroke Scale
NINDS National Institute of Neurological Disorders and Stroke
NKF-KDOQI Kidney Disease Outcomes Quality Initiative
NLST  National Lung Screening Trial
NOHAH  Nonocclusive hepatic artery hypoperfusion syndrome
NOMI   Nonocclusive mesenteric ischemia
NPH    Neutral protamine Hagedorn
NPO    Nil per os
NS     Normal saline
NSAID  Nonsteroidal anti-inflammatory drug
NSCLC  Non–small cell lung cancer
NSF    Nephrogenic systemic fibrosis
NTG    Nitroglycerin
NYHA   New York Heart Association
OD     Outer diameter
OP     Outpatient
OPSI   Overwhelming post-splenectomy infection
OR     Operating room
OSA    Obstructive sleep apnea
PA     Physician’s assistant; pulmonary artery
PACS   Picture archiving and communication system
PAD    Peripheral arterial disease; pulmonary artery diastolic
PAE    Prostate artery embolization
PAP    Pulmonary arterial pressure
PARTO  Plug-assisted retrograde transvenous obliteration
PAVM   Pulmonary arteriovenous malformation
PBD    Percutaneous biliary drainage
PCA    Patient-controlled analgesia; posterior cerebral artery
PCC    Prothrombin complex concentrate
PCDT   Pharmacomechanical catheter-directed thrombolysis
PCI    Percutaneous coronary intervention
PC-MRA Phase contrast-MRA
PCN    Percutaneous nephrostomy
PCORI  Patient-Centered Outcomes Research Institute
PCSA   Patient-controlled sedation
PCW    Pulmonary capillary wedge
PCWP   Pulmonary capillary wedge pressure
PD     Peritoneal dialysis
PDCA   Plan–Do–Check–Act
PE     Peroneal; pulmonary embolism/embolus
PEEP   Positive end-expiratory pressure
PEG    Polyethylene glycol
PEM    Polidocanol endovenous microfoam
PERP   Patient entrance reference point
PET    Positron emission tomography
PFO    Patent foramen ovale
PGA    Polyglycolic acid
PGJ    Percutaneous gastrojejunostomy
PIAA   Physicians Insurers Association of America
PICC   Peripherally inserted central catheter
PIOPED Prospective Investigation of Pulmonary Embolism Diagnosis
PJ     Percutaneous jejunostomy
PMMA  Polymethylmethacrylate
PMT  Percutaneous mechanical thrombectomy
PO  By mouth
PPH  Postpartum hemorrhage
P-PS  Power-pulse spray
pr  Per rectum
PRBC  Packed red blood cell
PRG  Percutaneous radiologic gastrostomy
PSA  Pseudoaneurysm
PSA  Prostate specific antigen
PSD  Peak skin dose
PSV  Peak systolic velocity
PT  Prothrombin time; posterior tibial
PTA  Percutaneous transluminal (balloon) angioplasty
PTC  Percutaneous transhepatic cholangiography
PTD  Percutaneous thrombolytic device
PTFE  Polytetrafluoroethylene
PTRA  Percutaneous transluminal renal angioplasty
PTS  Postthrombotic syndrome
PTT  Partial thromboplastin time
PTX  Pneumothorax
PV  Percutaneous vertebroplasty; portal vein/venous
PVA  Polyvinyl alcohol
PVC  Premature ventricular contraction
PVE  Portal vein embolization
PVR  Pulmonary vascular resistance; pulse volume recording
PVS  Portal vein stenosis
PVT  Portal vein thrombosis
QA  Quality assurance
qEASL  Quantitative European Association for the Study of the Liver
qid  Four times per day
QISS  Quiescent interval single shot
QOL  Quality of life
RA  Right atrium
RAO  Right anterior oblique
RAPTURE  Radiofrequency Ablation of Pulmonary Tumors Response Evaluation
RAS  Renal artery stenosis
RBBB  Right bundle branch block
RBC  Red blood cell
RCA  Root cause analysis
RCC  Renal cell carcinoma
RCT  Randomized controlled trial
RF  Radiofrequency
RFA  Radiofrequency ablation
RHV  Right hepatic vein
RI  Renal insufficiency; resistive index
RIJ  Right internal jugular
RIM  Rösch inferior mesenteric
<table>
<thead>
<tr>
<th>Acronym</th>
<th>Full Form</th>
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<tbody>
<tr>
<td>RN</td>
<td>Registered nurse</td>
</tr>
<tr>
<td>ROBOT</td>
<td>Rotational bidirectional thrombectomy</td>
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<tr>
<td>ROI</td>
<td>Region of interest</td>
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<tr>
<td>ROSE</td>
<td>Rapid on site evaluation</td>
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<tr>
<td>RPO</td>
<td>Right posterior oblique</td>
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<tr>
<td>RR</td>
<td>Respiratory rate</td>
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<tr>
<td>RT</td>
<td>Respiratory therapist</td>
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<tr>
<td>rt-PA</td>
<td>Recombinant tissue plasminogen activator</td>
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<tr>
<td>RV</td>
<td>Right ventricle</td>
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<tr>
<td>RVEDP</td>
<td>Right ventricular enddiastolic pressure</td>
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<tr>
<td>RVR</td>
<td>Renal vein renin</td>
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<tr>
<td>SAH</td>
<td>Subarachnoid hemorrhage</td>
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<tr>
<td>SAP</td>
<td>Superabsorbent polymer</td>
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<tr>
<td>SBP</td>
<td>Systolic blood pressure</td>
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<tr>
<td>SBRT</td>
<td>Stereotactic body radiotherapy</td>
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<tr>
<td>SC</td>
<td>Subcutaneous; subclavian</td>
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<tr>
<td>SEER</td>
<td>Surveillance, Epidemiology, and End Results</td>
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<tr>
<td>SEMS</td>
<td>Self-expanding metallic stents</td>
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<td>SEV</td>
<td>Superficial epigastric vein</td>
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<tr>
<td>SFA</td>
<td>Superficial femoral artery</td>
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<tr>
<td>sFLR</td>
<td>Standardized future liver remnant</td>
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<tr>
<td>SI</td>
<td>Sacroiliac</td>
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<tr>
<td>SICH</td>
<td>Symptomatic intracranial hemorrhage</td>
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<td>SIN</td>
<td>Salpingitis isthmica nodosa</td>
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<td>SIR</td>
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<td>SIRS</td>
<td>Systemic inflammatory response syndrome</td>
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<td>SK</td>
<td>Streptokinase</td>
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<td>SMA</td>
<td>Superior mesenteric artery</td>
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<tr>
<td>SMV</td>
<td>Superior mesenteric vein</td>
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<tr>
<td>SNMMI</td>
<td>Society of Nuclear Medicine and Molecular Imaging</td>
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<td>SNR</td>
<td>Signal-to-noise ratio</td>
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<td>SNRB</td>
<td>Selective nerve root block</td>
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<td>SPACE</td>
<td>Stent-supported Percutaneous Angioplasty of the Carotid Artery versus Endarterectomy</td>
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<td>Single-photon emission computed tomography</td>
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<td>SV</td>
<td>Superior vena cava</td>
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<td>SVR</td>
<td>Systemic vascular resistance</td>
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<td>SVS</td>
<td>Society of Vascular Surgery</td>
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<tr>
<td>SVT</td>
<td>Superficial venous thrombosis</td>
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