

DEPARTMENT OF RADIO - DIAGNOSIS & IMAGING



BIRAT MEDICAL COLLEGE TEACHING HOSPITAL

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INTRODUCTION

The Department of Radiodiagnosis and Imaging at Birat Medical College Teaching Hospital is a pinnacle of medical imaging excellence and innovation in Nepal. Our commitment to advancing healthcare through state-of-the-art diagnostic services sets a national standard. Equipped with world-class professionals and the latest diagnostic technology, we provide precise, efficient patient diagnoses. Our dedication to excellence and patient-centered care ensures that we meet and exceed the healthcare needs of our community, positioning us as a leading force in Nepal's radiodiagnosis and imaging field.



OUR TEAM OF EXPERTS



Prof. D.B Karki
MBBS, DMRD, MD
Professor
Head of Department



Dr. Manoj Bhattarai
MBBS, MD
Associate Professor



Dr. Roshana Khadka
MBBS, MD
Assistant Professor



Dr. Saurav Choudhary
MBBS, MD
Lecturer



Dr. Sushant Das
MBBS, MD
PhD Vascular & Interventional Radiology
(Tong Ji University, Shanghai, P.R.C)
Lecturer



Dr. Pralhad N. Bhandari
MBBS, MD
Lecturer



Dr. Manish R. Pathak
MBBS, MD
Fellowship in Vascular and Interventional Radiology
(Mahidol University, Bangkok)
Assistant Professor



Dr. Bhanu P. Shah
MBBS, MD
Fellowship in Onco - Radiology
(BPKMCH, Bharatpur)
Lecturer



Dr. Anil Yadav
MBBS, MD
Lecturer



Ms. Sushma Singh
Associate Professor
Coordinator, B.Sc. MIT
Radiology Supervisor



Mr. Manoj Mandal
Sr. Radiological Technologist
Technical Incharge – Radiology

HIGHLIGHTS



INNOVATION IN SAFETY:

Leading in Koshi with Thermo Luminescent Dosimeter (TLD) badges for radiation dose monitoring.



MRI EXCELLENCE:

Our 1.5 Tesla MRI system, with specialized coils and advanced DWI and DTI imaging, offers superior soft tissue contrast and detail for enhanced diagnostics.



ADVANCED CT TECHNOLOGY:

First outside Kathmandu to deploy a 512 slice CT scan, enhancing diagnostic precision with low radiation.



PREMIER INTERVENTIONAL RADIOLOGY:

The first in Koshi to offer Trans-arterial Chemoembolization (TACE), showcasing our advanced treatment capabilities.



COMPREHENSIVE X-RAY SERVICES:

Extensive special X-ray procedures, including HSG, IVP, and portable X-ray capabilities for emergencies.



STATE-OF-THE-ART RADIOGRAPHY:

Features a 45kW HF Fixed RAD System for instant image viewing and bedside radiography in critical care.



MAMMOGRAPHY EXCELLENCE:

Utilizes Allenger (Venus) system for unmatched breast imaging quality.

ACADEMIC PROGRAMME

- MD (Radiodiagnosis) Program (KU)
- B.Sc. MIT (Bachelor of Science in Medical Imaging Technology) from year 2024 (KU), 1st Medical College in Koshi Province to start B.Sc. MIT



OUR ADVANCED IMAGING SERVICES:

Our MRI-1.5 Tesla system is a cornerstone of our advanced imaging services, equipped with a suite of features and specialized services to ensure comprehensive diagnostic capabilities:

1. **All Routine MRI Exams:** Offering a broad spectrum of MRI diagnostics, from brain to musculoskeletal imaging.
2. **MRI Neurography:** Advanced imaging for detailed visualization of small nerves, not typically seen on standard MRI exams.
3. **Diffusion Weighted Imaging (DWI) & Diffusion Tensor Imaging (DTI):** Cutting-edge techniques for imaging brain connectivity and detecting acute stroke.
4. **Fiber Tractography:** A 3D reconstruction technique that visualizes neural tracts, invaluable for neurological assessment and surgical planning.
5. **Whole-body Diffusion-Weighted Imaging (DWI) MRI:** Provides a comprehensive overview of the body in a single examination, crucial for cancer staging and the identification of metastatic disease.
6. **Multi-parametric MRI (mpMRI):** Combines various imaging sequences for a detailed evaluation of organs, particularly useful for prostate imaging.
7. **MR Spectroscopy (MRS):** A technique that analyzes the chemical composition of tissues, offering insights into various brain disorders and tumor characterization.
8. **Breast MRI with Dedicated Breast Coil:** Essential for high-risk cancer screening, assessment of breast implants, and evaluation post-treatment.
9. **Whole Spine MRI:** Offers comprehensive imaging of the spinal column and cord for degenerative diseases, tumors, or trauma assessment.
10. **Dynamic Contrast Enhancement (DCE) & Perfusion Studies:** Advanced techniques to evaluate tumor vascularity and blood-brain barrier integrity.
11. **Magnetic Resonance Angiography (MRA) & Venography (MRV):** Non-invasive imaging of blood vessels, identifying vascular diseases without the need for catheterization.
12. **3D Volume Rendering Techniques (VRT) MRI:** Enhances the visualization of complex anatomical structures.
13. **MRI Renal Angio (Non-Contrast):** Assesses renal arteries for stenosis or anomalies without contrast use.
14. **MR Enterography:** Specifically designed for detailed examination of the small intestine, particularly in cases of Crohn's disease.
15. **CSF Flow Study:** Evaluates the flow of cerebrospinal fluid, aiding in the diagnosis of conditions like hydrocephalus.
16. **Cartilage Mapping:** Offers detailed assessment of cartilage health, crucial for diagnosing degenerative joint diseases.
17. **Magnetic Resonance Cholangiopancreatography (MRCP):** A non-invasive method to visualize the pancreatic and biliary ducts.



1.5 TESLA MRI

512 SLICES - CT SCAN

Our 512 slice CT scanner is a marvel of medical imaging technology. It uses advanced techniques to create detailed images of the body, helping doctors diagnose and treat conditions more effectively.



1. **Comprehensive Scans:** We can do all routine CT exams and a variety of specialized scans including detailed pictures of the heart (coronary angiogram), brain (cerebral angiogram), limbs (peripheral angiogram), kidneys (renal angiogram), lungs (pulmonary angiogram), and more.
2. **Advanced Protocols:** For more specific needs, we offer adrenal/pancreatic protocol scans, enterography for detailed views of the intestines, and triple phase CT scans for in-depth imaging of certain areas.
3. **Contrast Studies:** Using a bolus tracking method, we can time the contrast material perfectly to get the best possible images of blood vessels and organs.
4. **Calcium Scoring:** This test helps assess the risk of heart disease by measuring the amount of plaque in the heart's arteries.
5. **3D Imaging:** With 3D VRT (Volume Rendering Technique) and MIP (Maximum Intensity Projection) images, we can see complex structures in great detail.
6. **Virtual Tours:** Virtual bronchoscopy and colonoscopy allow us to check the inside of the lungs and colon without invasive procedures.
7. **Emergency Imaging:** Special imaging protocols for patients with blunt trauma or injuries from road traffic accidents (RTA) provide rapid, life-saving diagnostics.
8. **CT Angiogram:** This test shows the inside of blood vessels to detect blockages or other problems.
9. **Interventional Radiology:** We perform minimally invasive procedures guided by CT imaging for precise treatment delivery.
10. **Pediatric Imaging:** Tailored imaging for children uses the lowest possible radiation dose while ensuring high-quality images.

512 SLICES - CT SCAN

128 SLICE - CT SCAN (DEDICATED FOR ONCOLOGY)

1. **Precision Imaging:** Delivers detailed views of tumors for accurate targeting.
2. **Customized Plans:** Enables tailored radiation treatments, focusing on cancer while protecting healthy tissue.
3. **Fast Scans:** Reduces discomfort with quick imaging sessions.
4. **Enhanced Visualization:** Provides critical insights into tumor size, shape, and response to treatment.
5. **Seamless Integration:** Works directly with treatment planning systems for efficient therapy setup.
6. **Non-Invasive Staging:** Allows for detailed cancer staging without surgery.
 - Dynamic Studies: Shows how tumors interact with contrast, aiding in aggressiveness assessment.

This dedicated scanner supports our commitment to providing precise, personalized cancer treatment, enhancing care for our patients.



X-RAY SERVICES

Our X-ray department leverages the latest in digital radiography (DR) and computed radiography (CR) systems to deliver precise and clear imaging results. Our comprehensive suite of services is designed to meet a wide array of diagnostic needs:

1. **Special X-ray Procedures:** Our expertise extends to specialized X-ray techniques aimed at providing detailed insights into specific conditions:
 - A. **Hysterosalpingography (HSG):** An essential procedure for assessing the uterine cavity and fallopian tubes, aiding in fertility evaluations.
 - B. **Urography Studies (RGU/MCU/IVP/IVU):** Advanced imaging of the urinary tract, offering critical information on kidney and bladder health.
 - C. **Fistulogram/Sinogram/Arthogram:** Targeted imaging for exploring abnormal connections or joint structures, supporting accurate diagnosis and treatment planning.
 - D. **Silography:** Dedicated examination of the salivary glands, identifying obstructions or diseases.
 - E. **T-tube Cholangiography:** A specialized technique for clear imaging of the bile ducts, crucial for diagnosing liver or gallbladder issues.
 - F. **Barium Studies:** Comprehensive GI tract imaging, including Barium Swallow, Barium Enema, and Barium Meal Follow Through, for diagnosing disorders of the digestive system.
 - G. **Dedicated GIT X-rays:** Specialized procedures like duodenography, Lopogram, and Gastrography provide focused insights into gastrointestinal health.

- E. **Whole Spine X-ray:** Offers a complete visualization of the spine, facilitating the diagnosis of spinal conditions.
2. **Portable X-ray Machine:** Our mobile radiography unit enables bedside imaging, particularly valuable in emergency situations or for patients unable to visit the radiology department. This flexibility ensures timely diagnostics, directly impacting patient care and outcomes.
 3. **45kW HF Fixed RAD System:** This high-frequency radiography system is at the core of our department, offering:
 - A. Real-time image viewing for immediate analysis and diagnosis.
 - B. Bedside radiography services, bringing advanced diagnostic capabilities to the patient's side in ICUs and wards, minimizing the need for patient transport and enhancing comfort.

Our X-ray services embody our commitment to providing high-quality, patient-focused imaging. With state-of-the-art technology and a team of dedicated professionals, we ensure that each patient receives the most accurate and efficient diagnostic care available.

MAMMOGRAPHY

Mammography is a crucial X-ray imaging technique focused on the early detection of breast cancer and other breast diseases. Regarded as the gold standard in breast imaging, mammography is highly recommended for women over the age of 40 as a routine screening tool.

Our Mammography Unit (Allenger Venus) offers comprehensive services to ensure precise and detailed breast examinations:

1. **Comprehensive Imaging:** Provides all routine mammographic views along with special views to thoroughly examine breast tissue from multiple angles.
2. **Magnification View:** Enhances the visibility of small areas of interest, allowing for closer examination of breast tissue details.
3. **Compression Paddle:** Utilizes high-precision compression to spread the breast tissue evenly, ensuring clearer images while minimizing discomfort.
4. **High-Resolution Images:** The unit is designed to acquire high-resolution images, capturing the finest details for accurate diagnosis.



ULTRASONOGRAPHY

Our department is equipped with more than 15 state-of-the-art ultrasound machines that provide exceptional detail in imaging. These advanced systems enable our medical team to diagnose with greater accuracy and efficiency.

Patient Comfort and Advanced Procedures:

1. **Comprehensive Ultrasonography:** We offer a full range of ultrasound imaging, from abdominal scans to more specialized exams.
2. **Obstetrics and Gynecology Scans:** Specialized in women's health, including routine pregnancy scans and detailed fetal anomaly screenings.
3. **First Trimester Anomaly Scan (NT-NB Scan):** Utilizes Advanced 3D/4D imaging to assess fetal health early in pregnancy.
4. **Anomaly Scan:** Detailed examination in the second trimester to check for fetal developments and potential anomalies.
5. **Small Part Ultrasound Scans:** Focused imaging for thyroid, breast, testicular, and other small organs.
6. **Transvaginal Ultrasound:** Offers detailed views of the female reproductive system, enhancing diagnosis and monitoring.
7. **Doppler Facilities:** Essential for assessing blood flow in various parts of the body, aiding in the detection of vascular conditions.
8. **Strain and Shear Wave Elastography:** Advanced techniques to evaluate tissue stiffness, crucial in liver disease assessment and in differentiating between benign and malignant lesions.





INTERVENTIONAL RADIOLOGY

Interventional Radiology (IR) represents a forefront medical specialty, leveraging imaging guidance to diagnose and treat a wide array of conditions with minimized risk and enhanced precision. Our IR services encompass both diagnostic and therapeutic procedures, utilizing CT and ultrasound guidance to achieve accurate and effective outcomes.

Non-Vascular Procedures:

1. **USG and CT Guided FNAC and Biopsy:** Minimally invasive techniques for sampling tissue from tumors or masses.
2. **USG and CT Guided Aspirations:** Removal of fluid from abnormal collections in the body, such as abscesses or cysts.
3. **USG and CT Guided PIGTAIL Insertion:** For the drainage of abscesses or other fluid collections.
4. **USG Guided Diagnostic and Therapeutic Fluid Tapping:** Evaluation and relief of fluid accumulation in body cavities.
5. **PTBD, Cholangioplasty, Biliary Stenting:** Procedures targeting the biliary system to relieve obstructions.
6. **Percutaneous Nephrostomy and Antegrade DJ Stenting:** Techniques to ensure kidney drainage and maintain ureteral patency.
7. **Microwave Ablation and Radiofrequency Ablation of Tumors:** Minimally invasive tumor treatments using heat to destroy cancer cells.
8. **Sclerotherapy:** Injection of sclerosing agents to treat varicose veins and other vascular malformations.

Vascular Procedures:

1. **PICC Line and Tunneled Catheters:** For long-term intravenous access, supporting chemotherapy, nutrition, and medication administration.
2. **DSA Facility for:**
 - **Bronchial Artery Embolization:** Treatment for life-threatening hemoptysis.
 - **Angioembolization:** Addresses bleeding and supports tumor treatment in visceral and renal arteries, including uterine artery embolization for fibroids.
 - **Transarterial Chemo-Embolization (TACE):** Delivers chemotherapy directly to liver tumors.
 - **Transjugular Liver Biopsy:** A less invasive method for liver tissue sampling.
 - **AV Fistuloplasty:** Repair and maintenance of arteriovenous fistulas for hemodialysis access.