NeuViz 16
Quality You Can Afford

The pursuit of ever more accurate imaging procedures is complicated by the relentless pressure on healthcare institutions and physicians to produce more affordable diagnoses. In order to meet these conflicting demands, Neusoft developed the NeuViz 16, 16-slice computed tomography scanner, to achieve cost-effective, cutting-edge patient care.

“This system meets all requirements of the NEMA XR-29 standard and is fully SmartDose compliant.”
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CASE 1

Cervical Fracture

A 53-year-old male patient presented with neck pain after an automobile accident.

Coronal MPR and Coronal and Axial VR clearly visualize the fracture and extent of cord involvement.

CONCLUSION:
Fracture of 1st cervical vertebral body.
CASE 2

Arm Fractures

A 41-year-old male patient presented with arm discomfort and inability to flex the arm.

Metal Artifact Reduction software was used on axial acquisitions and then post processed. VR and MPR reformats demonstrated that the prosthesis and screws used to attach it were too long. The prosthesis was implanted to address the olecranon, coronoid apophysis, trochlea, humerus-ulna joint and radial head fracture.

CONCLUSION:
Additional surgery was performed to correct the prosthesis and motion rehabilitation prescribed.
CASE 3

Neck Mass

A 9-year-old patient presented with a neck mass, which had been present for three months.

Protrusion visualized using two levels of Surface Shaded Display (SSD) to characterize the mass. Direct axial and coronal MPR demonstrate the mass. Volume rendering (VR) demonstrated that there was no vascular involvement.

CONCLUSION:
Cystic Lesion, Ranula
CASE 4

Multiple Cerebral Aneurysms

A non-contrast brain scan was performed on a 70-year-old male who presented with persistent headaches for one month. Results of the brain scan demonstrated an acute cerebral hemorrhage. A CT angiography scan of the cerebral arteries was performed to rule out intracranial aneurysm.

Cases of multiple cerebral aneurysms (MCAs) account for nearly 20%-30% of all cerebral aneurysms. CT angiography reveals an aneurysm of the vertebral basilar system seen in the CPR (Curved Planar Reconstruction) image with evidence of atherosclerosis. Fusiform aneurysms at the bilateral MCAs are also noted.

CONCLUSION:
Multiple cerebral aneurysms with evidence of atherosclerosis.
CASE 5

CTA of Thoracic and Abdominal Aorta

A 65-year-old male presented with a 3-month history of abdominal pain. A CT angiography of the thoracic and abdominal aorta was performed to rule out aortic aneurysm.

Normal vessel wall is demonstrated in the thoracic-abdominal aorta and common iliac arteries. Calcifications are seen in the wall of the descending aorta without lumen stenosis.

CONCLUSION:
Aortosclerosis is found with no evidence of aneurysm.
CASE 6

Three-Dimensional Reconstruction for Rib Fractures

A 52-year-old male patient was admitted hours after injury in an automobile accident.

Patchy, high-density lesions were demonstrated in both sides of the lower lung. Local atelectasis was seen in the right lower lung. Arc and low-density gas in the right thoracic cavity and left pleural effusion were demonstrated. Fractures of the first, second ribs and the clavicle on the right side were seen.

CONCLUSIONS:
1. Contusion and laceration in both sides of the lower lung field.

2. Right lower lung collapse, right pneumothorax and left pleural effusion are visible.

3. Fractures of the first and second ribs as well as the right clavicle are seen.
CASE 7

Hepatic Hemangioma

During a routine ultrasound examination on an asymptomatic 78-year-old woman, a hypodense lesion in the liver was discovered.

Arterial phase views show edge enhancement of the lesion, which keeps pace with that of abdominal aorta. Three minutes after injection, the enhanced zone extended centripetally. Delayed scanning demonstrates isodense filling of the lesion. Progressive filling of the lesion indicates a hepatic hemangioma.

CONCLUSION:
Hemangioma in right liver lobe.
CASE 8

Portal Hypertension

A 55-year-old male patient was admitted to the hospital complaining of intermittent hemorrhage of the upper digestive tract over a period of one month.

VR reconstruction gave a direct and stereo view of the portal vein including its orientation, location and distribution. The transverse views revealed punctate, striped and twisted vessels.

CONCLUSION:
Portal hypertension and Varix of para-spleen and gastric fundus complicated by portal hypertension.
CASE 9

Mesenteric Lymphoma

A 61-year-old female with a known abdominal mass for two months was admitted after the patient complained of persistent abdominal pain for 20 days.

A 3.5cm x 6.1cm soft tissue mass is found in front of the transverse section of duodenum. It’s moderately enhanced on post-contrast view. The SMA, SMV and their branches are encased by the mass lesion. Multiple nodules of varying size are found around the lesion. In addition, a 5.8cm x 8.5cm retroperitoneal soft tissue mass is revealed, which encases the adjacent abdominal aorta and bilateral renal vein.

CONCLUSION:
Mesenteric lymphoma and retroperitoneal lymphadenectasis.
CASE 10

Colon Carcinoma

A 74-year-old male patient was admitted after two months of constant diarrhea and abdominal pain.

Markedly thickened wall of the hepatic flexure of the colon is visible, appearing as a tubular-shaped mass measuring approximately 4.5cm in diameter with narrowed lumen on the coronal view. The mass is obviously enhanced on the post-contrast images.

CONCLUSION:
Carcinoma of hepatic flexure of the colon.
CASE 11

CT Urography

An 18-year-old male patient presented with recurrent left flank pain over a span of two years.

Delayed CT scan was acquired 40 minutes after injection of contrast media. Volume rendering (VR) reconstruction was performed. Saccular enlargement of the left pelvis is displayed well. Malrotation of the left kidney with the renal hilum facing ventrally is revealed. Stenosis at the junction of the pelvis and ureter is demonstrated without adjacent mass lesion and dilatation of distal ureter. The bladder is filled well without abnormality.

CONCLUSION:
Benign stricture at the junction of the left renal pelvis and ureter causing homolateral hydronephrosis.
CASE 12

Alveolar Soft Tissue Sarcoma of the Lower Extremity

A 23-year-old male patient presented with a soft tissue mass in the left thigh.

A tumor measuring 6cm × 9cm × 17cm located in the lateral deep muscle tissue of the left thigh appeared as an irregular form with undefined margins and containing some spot and sand particle calcification. Most parts of the mass achieved high enhancement with enhanced CT scans of the left thigh. There were two elliptic masses in the left inguinal and pelvis with non-homogeneous and moderate enhancement. CTA mapped out the mass outline, showed the increased vascular tortuosity, the arteriovenous fistula, and the early venous opacification.

CONCLUSION: Alveolar soft tissue sarcoma in lower extremity.
CASE 13

CTA Runoff

A 35-year-old female patient.

CONCLUSION:
Normal case.

EXAMINATION: CTA runoff of both lower extremities
CASE 14

Tuberculosis of Lumbar Spine and Pelvis

A 23-year-old female patient presented with flank pain worsened with exertion.

Scans demonstrate destruction of bone of the left sacrum and sacroiliac joint accompanied by a soft tissue mass beside the major left psoas muscle. There are pitted lesions in the left sacroiliac joint surface with widened joint space in which soft tissue density lesions and bone fragments are visible.

CONCLUSION:
Tuberculosis of lumbar spine.
Fracture of tibial plateau, articular cavity hydrops

Fracture of right patellar
Fracture of calcaneus

Fracture of femoral neck

Fracture of the hip

Fracture of nasal bone
**Generator**
- Maximum output: 50kw
- MA range: 30mA~420mA
- KV switch: 90KV, 120KV, 140KV

**Detector**
- Material: Solid-State GOS
- Number of elements: 16,128
- Active elements per slice: 672
- Detector arrangement: 24 rows
- Slip ring: Capacitive -1.1 Gbps transfer rate
- Scan collimation: 16x1.5mm, 12x1.5mm, 10x1.5mm, 16x0.75mm, 12x0.75mm, 10x0.75mm, 8x0.75mm, 2x0.75mm, 4x0.75mm
- Data acquisition rate: 1160, 2320, 4640 views/rotation

**Image quality**
- Spatial resolution: 15.0 lp/cm @ cut-off [512X512 matrix, 120KV, 250mAs, FOV 50mm, 12mm, ED, System Phantom, 22.38 mGy]
- Low contrast resolution: 4.0 mm @ 0.3% [120kVp, 250 mAs, 9mm 250mm FOV, USA filter, 39.8mGy surface, 20 cm CATPHAN phantom]
- Noise: 0.35% [120kVp, 250mAs, 9mm, 250mm FOV, 5A filter, 20cm water equivalent phantom]
- Absorption range: -1024 to +3072 Hounsfield units
- Absorption rate: 98%
- CTDI: [120KV, 180mA, 1.0s, 16*1.5mm]
  - Head: 15.8 mGy/100mAs surface
  - 14.3 mGy/100mAs Center
  - Body: 9.6 mGy/100mAs surface
  - 4.6 mGy/100mAs Center

**Phantom:**
1. Tower phantom (7 inch, 10 inch) for system calibration
2. Step phantom for system calibration
3. Philips System Phantom for QA purpose

**X-Ray Tube**
- Anode storage capacity: 5.0 MHU
- Focal spots: 0.5x1.3mm (small); 1.0x1.3mm (large)
- Anode rotate speed: 6300 RPM/ISO
- Center to focal spot distance: 570mm
- Focus to detector distance: 1040mm
- Anode continuous cooling rate: 6KWMax.
- Anode heat dissipation rate: 9.6KW (815 kHU/min)
- Cooling Mode: oil cooling
Dynamic Focal Spot (DFS) doubles the data sampling density effectively doubling the number of detectors in axial and spiral scanning and providing high spatial resolution in axial and spiral scanning.

Beam fan angle: 52 degree
Collimator type: lead, 4mm.
Filter: (Ti (Thickness: 1.2mm) + Teflon (Thickness: 2mm)) equiv 6.68mm Al

**Gantry System**

Gantry aperture: 700mm (700mm±10mm)
Gantry tilt: +/-30° (0.5°increments) accuracy +/- 2°
Scan speeds/s/360°): 0.5s, 0.6s, 0.75s, 1.0s, 1.5s, 2s (Partial scan speed: 0.33s for 240)
Scan localizer: (Laser positioning lamp) sagittal and transverse localizer

**Patient Table System**

**Longitudinal Motion**

Manual stroke: 1580 mm
Scannable range: 1500 mm
Max scan range: 1500mm
Speed: 0.1 to 100 mm/sec.
Position accuracy: ±0.25 mm

**Vertical Motion**

Range: 430 to 970 mm above floor; 1.0 inc
Table load capacity: 205 kg (450 lbs.) with 0.25mm z-axis accuracy
Speed: 9mm~15mm/sec.
Floating tabletop: Carbon-fiber tabletop with foot pedal and push button table brake release

**Scan and Image Acquisition**

**Scout Scanning**

Scan orientation: PA, AP, LAT
Scan range: 50m~1500mm
Scan speed: 100mm/sec.
FOV variable: 50-500mm

**Spiral Scanning**

Multiple, bi-directional, contiguous slices acquired simultaneously with continuous table movement during scans.

Spiral exposure: Up to 100 sec. of uninterrupted spiral scanning (Power<36kW, acquisition time max = 102s, 36kW<Power<42kW, acquisition time max = 80s, Power>42kW, acquisition time max = 60s)
Spiral pitch: 0.5 to 1.5 (user selectable 0.1 inc or auto pitch factor 0.5, 0.6, 0.67, 0.86, 1.0, 1.2, 1.5)
Slice thickness: 0.75mm, 1mm, 1.5mm, 2mm, 2.5mm, 3mm, 4mm, 5mm, 6mm, 7mm, 8mm, 9mm, 10mm

**Axial Scanning**

- Multiple-slice scan with up to 16 contiguous slices acquired simultaneously with incremental table movement between scans.
- Fused modes for reconstructing partial volume artifacts free thick slices from thin slice acquisition.
- Slice thickness: 0.75mm, 1.5mm, 3mm, 4.5mm, 6mm, 9mm and 12mm.

**Dynamic Multi-Scanning**

Multiple (continuous) axial scanning without table movement for fast dynamic contrast study.

Dynamic scan: 1s, 2s, 3s
Cycle time: 0.6s
Scan times: 0.5, 0.6, 0.75, 1, 1.5, 2 seconds for full 360° scans

Manual scanning places slice-by-slice scans under operator, triggered by enable button or foot pedal.
Console Computer

**Dell Precision™ T5400 Workstation**
- CPU frequency: >=2GHz (Xeon processor)
- Graphic processor: 1 GPU
- Memory: 8GB
- Hard disk capability: 750GB
- Maximum image storage: Storage capacity >= 400,000
- DVD — RW driver: 7500 images of 512 matrix/per 4.7GB disk with embedded DICOM viewer
- User interface: CH & EN
- Monitor: 19' LCD
- Monitor resolution matrix: 1280x1024
- DICOM 3.0 configuration: DICOM Print/Store; DICOM Send
- Option configurations: DICOM MPPS/DICOM modality worklist (HIS/RIS)
- Connectivity: 10/100/1000Mbps (10/100/1000BaseT)
- UPS: APC UPS for console 1000VA, 670W, 4.5A
- Reconstruction speed: 20 images/second

CT Site Planning

**Dimensions & Weight**
- Gantry: 2244mm(L) x 890mm(W) x 1920mm(H)
- Gantry weight: <=1900kg
- Gantry package: 2370mm(L) x 1030mm(W) x 2250mm(H)
- Couch: 2420mm(L) x 575mm(W) x 1055mm(H)
- Couch weight: <=430kg
- Couch package: 2570mm(L) x 970mm(W) x 1230mm(H)
- Console table: 1400mm(L) x 800mm(W) x 760mm(H)

**Power Supply Requirement**
- Power capacity: 80KVA
- Input voltage: 3-phase 4-line (with isolation transformer), power supply from these options: 200/208/220/230/240/380/400/415/440/460/480VAC
- Voltage variation: tolerance <=+10%
- Drop with loading: <=5% of the rating
- 3-phase unbalance: <=5%
- Frequency: 50Hz/60Hz±1Hz
- Grounding resistance: Independent grounding
- Resistance <4: Common grounding resistance <1Ω
Environment Requirements
Minimum area of scan room: 18 m² Min.
Area of operating room: 4.8 m²
Recommended room size: 20 m²
Minimum height of ceiling: 2300 mm
Temperature of scan room: 18°C ~ 24°C
Temperature of control room: 15°C ~ 30°C
Humidity of scan room: 30% ~ 60%
Humidity of control room: 20% ~ 80%
Atmospheric pressure: 70kPa ~ 106kPa
Temperature of transportation and storage: -20°C ~ 55°C
Shock is less than 10G with package
Humidity of transportation and storage: 10% ~ 90% (no-condensing)
Atmospheric pressure: 50kPa ~ 106kPa
Running noise: < 70dB(A) (1 meter distance)
Heat dissipation:
  Gantry: 26,638 BTU/hr
  Computer: 2,561 BTU/hr