

Differential Diagnosis for Back Pain

Cause	Goroll & Mulley	Porter	Labus & Kavalak	Kasper	Gomella	Paulman	Wasson	Seller	Total	Collected Cases
Degenerative disk disease (inc HNP)	x	x	x	x	x	x	x	x	8	18
Neoplasm - metastatic	x	x	x	x	x	x	x	x	8	18
Fracture (trauma & insuff)	x	x	x		x	x	x	x	7	38
Lumbar strain or sprain	x	x	x		x	x	x	x	7	
Aortic aneurysm	x	x	x		x		x		5	2
Spinal stenosis			x	x	x		x	x	5	3
Ankylosing spondylitis	x		x		x		x		4	9
Osteoarthritis facet joints		x		x			x	x	4	3
Osteomyelitis	x		x		x		x		4	2
Spondylolysis/spondylolisthesis	x	x	x	x					4	10
Diskitis	x	x			x				3	2
Multiple myeloma	x		x		x				3	1
Renal calculus	x		x				x		3	1
Endometriosis			x		x				2	
Epidural abscess	x				x				2	2
Herpes Zoster							x	x	2	
Neoplasm – primary spine	x	x							2	4
Pancreatitis			x				x		2	
Perforated ulcer			x				x		2	
Appendicitis			x						1	
Cholecystitis			x						1	
Chordoma			x						1	
Inflammatory bowel disease	x								1	
Inflammatory disease	x								1	
Lymphoma, leukemia	x								1	
Neoplasm – primary pelvic	x								1	1
Prostate cancer			x						1	
Psoriatic arthritis	x								1	1
Pyelonephritis			x						1	
Reiter’s syndrome	x								1	
Arachnoiditis										3
Diastematomyelia										1
Paget disease										1

Differential Diagnosis for Back Pain with Clinical and Imaging Findings

Cause	Clinical Features	Imaging Findings
Conus and Spinal Canal Diameter and Contents		
Metastatic carcinoma	Known primary tumor; systemic features (weight loss, fever, failure to thrive).	MR, CT-myelo: intramedullary, intradural extramedullary, and extramedullary masses; MR: leptomeningeal enhancement.
Spinal stenosis	Neurogenic claudication.	Reduced diameter of the spinal canal, subarticular recess, or neural foramen.
Epidural abscess	Fever, elevated WBC, elevated ESR and CRP.	Epidural soft tissue lesion showing decreased SI on T1WI and increased SI on T2WI lacking central enhancement.
Spinal canal tumor	Associated neurologic deficit.	Intradural tumor.
Paraspinal Structures and SI Joints		
Metastatic carcinoma	Known primary tumor; systemic features (weight loss, fever, failure to thrive).	MR, CT: retroperitoneal lymphadenopathy.
Aortic aneurysm	Known vascular disease; pulsatile abdominal mass.	Distended aorta.
Ankylosing spondylitis	Associated inflammatory bowel disease; spondyloarthropathy.	MR, CT, XR: fused SI joints; MR: subchondral inflammatory changes.
Osteoarthritis	Polyarthropathy.	Joint space narrowing, osteophyte formation, subchondral sclerosis/cysts.
Renal calculus	Flank pain; hematuria.	Appropriately located calculus; associated hydronephrosis.
Endometriosis	Cyclical pain associated with menses.	Adnexal and other pelvic masses.
Bones		
Metastatic carcinoma (including multiple myeloma)	Known primary tumor; systemic features (weight loss, fever, failure to thrive).	MR, CT, XR: Destruction of bone cortex and marrow; replacement of marrow with tumor.
Osteoporotic compression fracture	Postmenopausal status; known osteoporosis.	MR, CT, XR: wedge compression deformity; CT, XR: demineralization; MR: decreased SI on T1 and increased SI on T2.
Post-traumatic fracture	Injury.	MR, CT, XR: wedge compression deformity; CT, XR: demineralization; MR: decreased SI on T1WI and increased SI on T2WI.
Ankylosing spondylitis	Associated inflammatory bowel disease; spondyloarthropathy.	MR, CT, XR: squared vertebral bodies; CR, XR: "shiny corners".
Osteomyelitis	Fever, elevated WBC, elevated ESR and CRP.	MR, CT, XR: Destruction of bone cortex and marrow; replacement of marrow with tumor.
Spondylolisthesis	Associated radicular symptoms	Malalignment of vertebrae; associated pars defects in lytic spondylolisthesis.
Chordoma	Associated radicular symptoms	Sacral mass.

Intervertebral Discs and Facet Joints (Each Visualized Level)		
Herniated disc	Associated radicular symptoms	Disc contour abnormality; intrathecal mass (with an extruded fragment), associated loss of disc height in some cases.
Osteoarthritis	Polyarthropathy. Neurologic deficit with associated stenosis from bone spur or synovial cyst.	Joint space narrowing, osteophyte formation, subchondral sclerosis/cysts. Synovial cyst.
Diskitis	Fever, elevated WBC, elevated ESR and CRP.	MR: decreased SI on T1WI and increased SI on T2WI; MR, CT, XR: bone destruction with associated osteomyelitis.
Processes with minimal or no findings on imaging		
Lumbar strain or sprain, herpes zoster, mechanical back pain.		
ABBREVIATIONS		
CRP = C reactive protein; CT = computed tomography; ESR = erythrocyte sedimentation rate; SI = signal intensity; T1WI = T1 weighted images; T2WI = T2 weighted images; US = ultrasound; WBC = white blood cell count		

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