Back Pain

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8.1 Definition

Back pain is defined as pain felt in the back that may have various reasons and clinical presentations. The reasons for back pain can be diverse (see also Sect. 8.4): musculoskeletal diseases (e.g., disc herniation, scoliosis), trauma, spinal infections (e.g., discitis, osteomyelitis) or non-spinal infections (e.g., paraspinous muscle abscess, pyelonephritis, pneumonia, pelvic inflammatory disease), tumors or metastasis, urological disorders (e.g., urolithiasis or ureteropelvic junction obstruction), or chronic pain syndromes [1]. Lifting or twisting can release muscle-related pain, while bone-related pain is often aggravated by extension.

The pain may be localized in the neck, the upper or lower back, or across these regions. The pain may radiate into the upper or lower limbs as well as into the ventroinguinal region. Pain character can be acute or chronic, dull or sharp, colicky, intermittent, or permanent.

Back pain may be accompanied by other symptoms such as fever, nausea, vomiting, dysuria, or neurological impairment.

8.2 Medical History

The medical history in patients having back pain should include questions regarding pain onset (> differentiation between acute and chronic pain) and the pain character (e.g., radiating or not, motion-dependent or not, intensity). It is

Conflict of Interest
The authors have nothing to disclose

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important to get detailed information about accompanying symptoms such as fatigue, fever and weakness, neurological impairment, weight loss, or dysuria. Besides, current ongoing disorders and preexisting diseases, previous treatments or surgery, current medication, and physical and social activity should be inquired.

In urology, back pain is a common symptom. Pain originating from the kidneys or ureters can be localized in the flanks or lower back. It may radiate into the ipsilateral groin, testis, or labium. Patients with a renal colic usually describe a heavy, colicky pain, often accompanied by parasympathetic symptoms including sweating, nausea, and/or vomiting. Patients with acute renal colic often bent over to the side of pain and hold their flank. In upper urinary tract infections, pain is usually described as more constant and dull combined with fever. Chronic urinary retention, bladder tumors, and upper urinary tract tumors may lead to upper urinary tract dilatation and also may be accompanied by dull flank pain.

8.3 Diagnostics

The flow chart presents an overview of anamnestic and diagnostic steps (Fig. 8.1). A physical examination with inspection and palpation of the back, the flanks, and the genital area is mandatory. The patient should be examined for tenderness on palpation and pain released by percussion, respectively.

If neurological impairment is suspected, a neurological examination should be performed including examination of sensitivity, power, reflexes, and nerve extension pain. For example, spinal disc herniation may compromise the cauda equina resulting in bladder dysfunction, impaired sphincter tonus, and saddle anesthesia. Therefore, voiding and anal sphincter tension should be checked in patients at risk for cauda equina syndrome.

It is of critical importance to recognize serious causes of back pain that need urgent or immediate further diagnostics or treatment (e.g., computed tomography (CT), magnetic resonance imaging (MRI), surgery).

In assumption of an infection, vital signs and body temperature should be taken as well as blood and urine analysis. Blood analysis should be checked for systemic signs of an infection or signs of sepsis; blood cultures should be taken. Urine analysis should comprise dipstick test and urine culture.

In patients presenting with flank pain accompanied by dysuria, fever, or hematuria, ultrasound of the abdomen (kidneys, urinary bladder, retroperitoneum, and testis) should be performed. In addition, the liver, gallbladder, and pancreas should be examined to rule out concomitant disorders.

Patients with a renal colic due to urinary tract stones might have a consecutive dilation of the renal pelvis in ultrasound. Elevated creatinine level and microscopic hematuria help confirm the diagnosis. Nowadays, a native CT scan is the diagnostic tool of choice in renal and ureter stones (Fig. 8.2a, b).

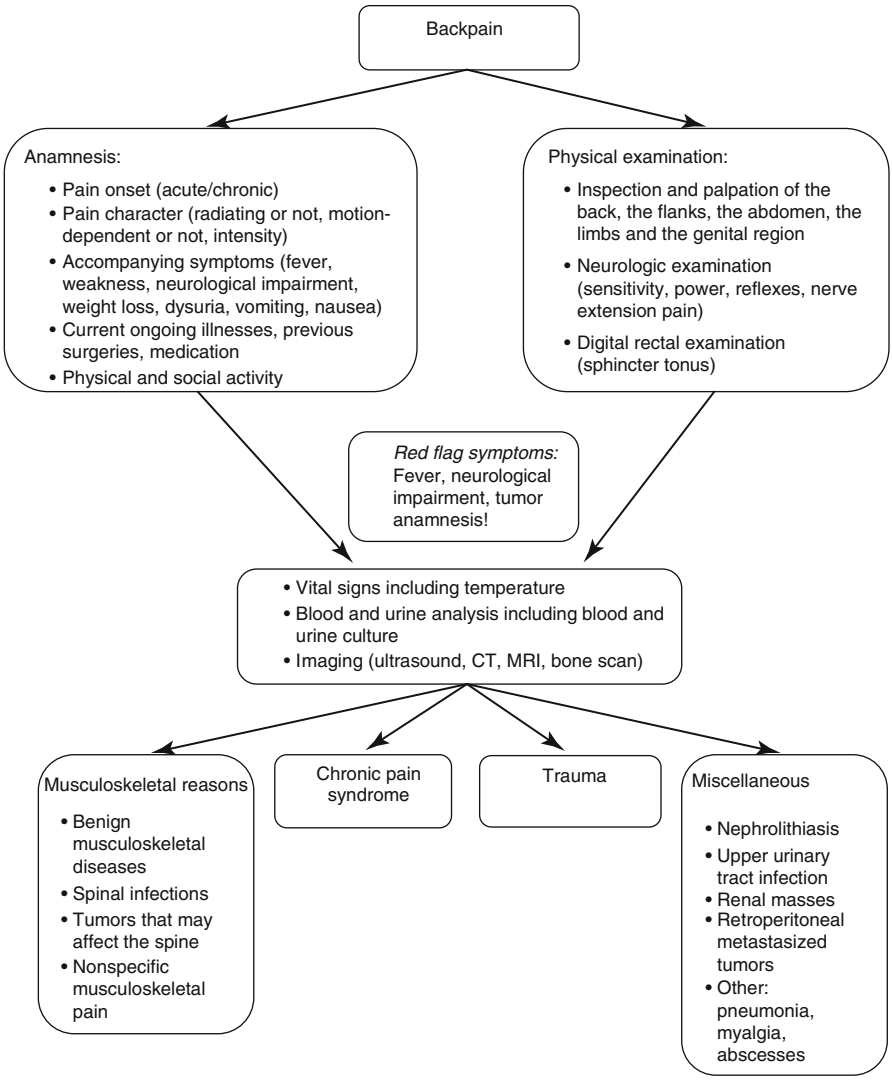

Fig. 8.1 Flow chart demonstrating the pathway from symptoms to diagnosis in patients presenting with back pain

Other urological reasons for flank and lower back pain might be renal masses (renal cell carcinoma, upper tract urothelial carcinoma), retroperitoneal lymph node metastasis in almost any urological carcinoma (i.e., prostate, bladder, renal cell, upper urinary tract, or testicular cancer), or an abscess-forming pyelonephritis (Fig. 8.3a, b). In case of malignancies, additional diagnostic tests should be performed to complete the staging.

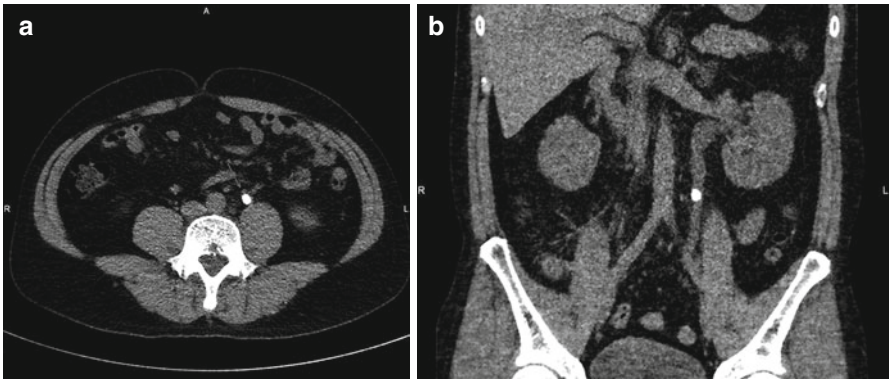

Fig. 8.2 Native CT scan of a 43-year-old male patient showing an impacted 7 mm stone in the ureter on the left-hand side. (**a**) Transverse plane; (**b**) Coronal plane

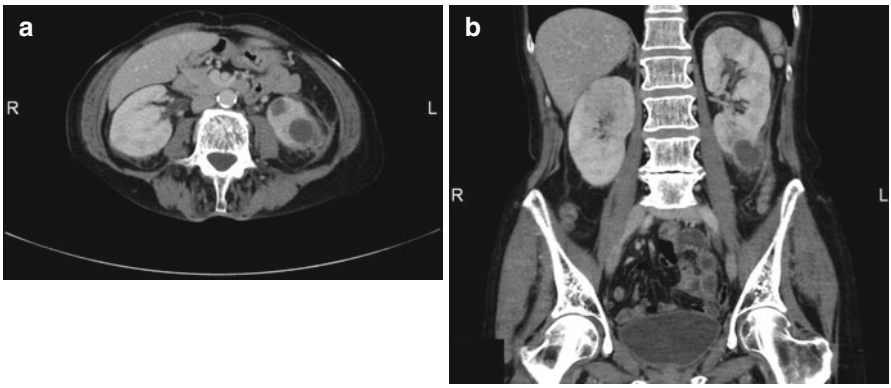

Fig. 8.3 Contrast enhanced CT scan of a 56-year-old female patient showing an abscess-forming pyelonephritis on the left-hand side. (**a**) Transverse plane; (**b**) Coronal plane

8.4 Differential Diagnosis

There are several differential diagnoses that may be the reasons for back pain. An interdisciplinary assessment is recommended when diagnosis remains inconclusive at first sight. Physicians from general, trauma, and/or spine surgery, internal medicine (including rheumatology), urology, gynecology, and/or neurology may be involved in the initial workup procedure.

Table 8.1 presents an overview of differential diagnosis and related diagnostic procedures to confirm diagnosis.

Table 8.1 Differential diagnosis and diagnostic procedures for back pain workup

Differential diagnosis	Diagnostics
Benign musculoskeletal diseases	
Spondylolysis	Physical examination
Scoliosis	Imaging (X-ray, MRI)
Spinal disc herniation	
Degenerative spinal disc changes	
Spinal infections	
Discitis	Physical examination
Vertebral osteomyelitis	Laboratory features (CRP, leukocytes)
Epidural abscess	Imaging (CT, MRI)
Tumors that may affect the spine	
Leukemia	Laboratory features (complete blood count)
Lymphoma	Imaging (CT, MRI, bone scan)
Sarcoma	
Neurofibroma	
Trauma	Anamnesis
	Physical examination
	Imaging (depending on anamnesis)
Nonspecific musculoskeletal pain	Anamnesis
	Physical examination
Nephrolithiasis	Anamnesis
	Laboratory features (creatinine, microscopic hematuria)
	Ultrasound, CT
Pyelonephritis	Anamnesis
	Physical examination
	Laboratory features (CRP, leukocytes, leukocyturia)
	Urine culture
	Imaging (Ultrasound, CT)
Renal masses	Anamnesis
	Ultrasound, CT
Retroperitoneal metastasized tumors	Anamnesis
	Physical examination
	Ultrasound, CT
Chronic pain syndrome	Anamnesis
Others	
Pneumonia	Anamnesis
Myalgia	Physical examination
Paraspinous muscle abscess	Laboratory features (CRP, leukocytes)
	Imaging (dependent on suspected diagnosis)

Reference

1. Nigrovic P. Back pain in children and adolescents: overview of causes [Internet]. UpToDate; 2013. Available from: www.uptodate.com/store.