

## Causes and Consequences of Back Pain

**Franjić S\***

Independent Researcher, India

**\*Corresponding author:**

Siniša Franjić,  
Independent Researcher, India,  
E-mail: sinisa.franjic@gmail.com

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### 1. Abstract

Back pain is one of the most common forms of body pain. Back pain can be felt in many ways. It can range from mild to severe pain that can affect the ability to move. Back pain can be felt as muscle pain, stabbing pain, pain that spreads down the legs, and as reduced flexibility or range of motion. Back pain can be felt as tingling or pricking, a dull feeling of pain or sharp pain. Back pain has a number of causes. Back pain can affect your quality of life.

### 2. Introduction

The clinical history is a critical initial step in the evaluation [1]. As is the case in any interaction between individuals, this requires the physician to establish a relationship with the patient that facilitates the accurate verbal transmission of information. This is a two-way street. The patient must feel enabled to present his or her history both fully and accurately. The physician must be able to elicit such information and accurately interpret it without prejudice or bias (either scientific or social). This is often called a patient-centered approach to the history. Acquiring such interviewing skill is an early and essential part of the training of a medical student. To facilitate obtaining and recording an accurate, organized, patient history, a standard approach is generally used on an initial encounter, although it may

be modified on subsequent visits. This is often considered to be the center of the patient–physician encounter and consists of a body system–oriented, head to toe–review of all presenting symptoms in an organized manner. The review may disclose additional symptoms not initially reported by the patient that are important to the diagnosis. A physician investigating the presenting symptom of back pain may elicit the additional symptom of pain on urination during the review, which suggests

potential urinary tract disease. The experienced physician often will undertake this review as part of the physical examination.

### 3. Test Cycle

Surgical pathology is a laboratory discipline of testing that has a defined test cycle of preanalytic, analytic, and postanalytic [2]. Preanalytic and postanalytic challenges of specimen identification and processing as well as report generation and delivery are similar to processes that occur in clinical laboratories. The specimens in surgical pathology are unique and many times cannot be obtained a second time as can be done with blood or urine specimens. The procedures to obtain surgical pathology specimens are also far more complex making it unpalatable to lose, mislabel, or mishandle a specimen. Unique to surgical pathology is that the analytic phase of the test cycle is largely dependent on pathologists' cognitive ability to interpret visual evidence and recognize disease. This adds to the complexity of the process but also offers potential solutions. It is the author's belief that the analytic phase of the test cycle is dependent on five factors:

1. The pathologist's knowledge, experience, and training,
2. Clinical correlation,
3. Use of ancillary confirmatory testing,
4. Use of standardized criteria for diagnosis and reporting standardized elements, and
5. Selectively reviewing cases to assure accuracy.

### 4. Retroperitoneum

Anatomically, the retroperitoneum is a space in the body cavity behind the peritoneum and contains several structures, including much of the urinary tract (kidneys, adrenal glands, ureters), part of the alimentary tract (most of the duodenum, the head, neck and

body of the pancreas, ascending and descending colon, and the rectum) and the main abdominal vessels (aorta and inferior vena cava) and draining lymph nodes [3]. Retroperitoneal masses may arise from any of the above. Most commonly, however, retroperitoneal masses are lymph nodes which are usually enlarged through either malignancy or infection. Infectious causes of retroperitoneal lymphadenopathy are rare and are generally a consequence of tuberculosis. Malignancy is a far more frequent cause, giving rise to either haematologic disorders or metastases. The latter may arise from primary tumours in any organ whose lymphatic drainage is to para-aortic nodes, including much of the lower gastrointestinal tract, while germ cell tumours (primary retroperitoneal tumours or metastases) are a common cause, especially in younger patients. Haematologic causes of retroperitoneal lymphadenopathy include both Hodgkin's and non-Hodgkin's lymphoma. The central necrotic area of the mass in this case is suggestive of a high-grade malignancy, and in a patient of this age, a high-grade lymphoma is most likely. Further investigations would include haematologic tests such as LDH, the level of which is indicative of the rate of cell turnover, a blood film and a staging CT (chest, abdomen and pelvis). Diagnostic imaging, by way of biopsy, is of absolute importance. The deranged liver function in the above case is likely due to compression of the biliary tree by the large mass. An ultrasound of the liver itself may be indicated if this is not the case.

## 5. UTI

UTIs (urinary tract infection) are classified by anatomy into lower and upper UTIs [3]. Lower UTIs refer to infections at or below the level of the bladder, and include cystitis, urethritis, prostatitis, and epididymitis (the latter three being more often sexually transmitted). Upper UTIs refer to infection above the bladder, and include the ureters and kidneys. Infection of the urinary tract above the bladder is known as pyelonephritis. UTIs are also classified as complicated or uncomplicated. UTIs in men, the elderly, pregnant women, those who have an indwelling catheter, and anatomic or functional abnormality of the urinary tract are considered to be complicated. A complicated UTI will often receive longer courses of broader spectrum antibiotics.

Importantly, the clinical history alone of dysuria and frequency (without vaginal discharge) is associated with more than 90% probability of a UTI in healthy women. Urine dipsticks are one of the most widely used tests, although interpreting the results is not simple. A positive result for both nitrites and leukocyte esterase has a higher sensitivity than a positive result for only one of the two. Nitrites are not normally found in the urine but are produced by the action of certain (but not all) bacteria on urinary nitrate. A positive leukocyte esterase test indicates the presence of neutrophils, a marker of infection. This infection may be a UTI, but may also be caused by other infections of the genito-urinary tract. Collecting urine for microscopy, culture and sensitivity (MC&S)

is the gold standard for diagnosing a UTI.

In women, a UTI develops when urinary pathogens from the bowel or vagina colonize the urethral mucosa, and ascend via the urethra into the bladder. During an uncomplicated symptomatic UTI in women, it is rare for infection to ascend via the ureter into the kidney to cause pyelonephritis. Risk factors for a UTI include being female (shorter urethra that is close to the anus), previous UTI, a urinary catheter, intercourse (which promotes movement of organisms up the urethra), use of spermicides, and new sex partners. UTI in men is uncommon, and usually occurs secondary to an underlying structural or functional abnormality of the urogenital tract resulting in obstruction to urine flow. The commonest of these is prostate enlargement.

## 6. EFT

Patients with EFT (extraosseous ES family of tumors) present with localized pain or swelling of a few weeks or months duration [4]. A minor trauma may be the initiating event that calls attention to the lesion. The pain is mild at first, but intensifies rapidly and is aggravated by exercise and the supine position. A distinct soft tissue mass is sometimes appreciated in a swollen and erythematous limb. When present, it is firmly attached to the bone and tender to palpation. Patients with juxta-articular lesions present with loss of joint motion, while lesions involving the ribs are associated with direct pleural extension and large extraosseous masses. Tumors involving the axial skeleton result in localized back pain or radicular symptoms. Spinal cord compression is heralded by loss of bowel or bladder control. Constitutional symptoms or signs, such as fever, fatigue, weight loss, or anemia, are present in 10% to 20% of patients at presentation. Fever arises from cytokine production by tumor cells and, along with other systemic symptoms, is associated with advanced disease.

Approximately 80% of patients present with seemingly localized disease. Overt metastases may become evident within weeks to months, if the diagnosis is delayed and effective therapy is not provided. Patients with primary pelvic tumors are more likely to present with metastatic disease compared to other sites. Metastases are found in lung and bone, especially the vertebral column. Lung metastases represent the first site of distant spread in 70% to 80% of

cases, and are the leading cause of death for patients with EFT. Lymph node, liver, and brain involvement are distinctly uncommon.

## 7. Disk Disease

With age, the intervertebral disks undergo a progressive wear-and-tear degeneration of both the nucleus and the annulus [1]. The nucleus becomes more dense because its water content is reduced, and the annulus becomes weakened and thinned. When marked compression force is applied to the anterior part of the disk during flexion of the spine, the nucleus is forced posteriorly against the

weakened annulus, and part of the nucleus may be forced into the spinal canal through a weak area or tear in the annulus. Most often, a disk protrusion occurs in the lumbosacral region because this is the part of the vertebral column where the disks are subject to the greatest mechanical compression during lifting. The disk usually protrudes in a posterolateral direction because the dense posterior longitudinal ligament reinforces the annulus in the midline, preventing a direct posterior protrusion. Symptoms of disk protrusion (disk herniation or “slipped disk”) in the lumbosacral region, consist of sudden onset of acute back pain after an episode of lifting. Frequently, the pain is also felt in the leg and thigh on the side of the protrusion because the extruded disk material often impinges on lumbosacral nerve roots, causing pain to radiate along the course of the nerve compressed by the protruded nucleus pulposus. When nerve compression is severe, numbness of the inner thighs, back of legs, and around the anus may occur (saddle anesthesia). If the lowest region of the cord nerve roots (the cauda equina) is compressed, loss of bladder and bowel function may occur, necessitating immediate surgical intervention.

## 8. Multiple Myeloma

Plasma cells are derived from B lymphocytes that have been sensitized to a specific foreign antigen and produce antibodies against that antigen [5]. In MM, a clone of plasma cells proliferates independently of normal immune stimulation. Multiple myeloma is the most common primary malignancy of bone. The incidence is increased in the elderly, males, and African Americans.

Multiple myeloma (MM) is a neoplasm of monoclonal plasma cells that proliferate in the bone marrow and cause a space-occupying lesion (myelophthisis) that manifests as pancytopenia and destruction of bone. The bone marrow replacement results in suppression of myelopoiesis, leading to anemia followed by bone marrow failure. The destruction of bone manifests as osteolytic lesions, bone pain, pathologic fractures, and hypercalcemia. It is believed that cytokines that are osteoclast-activating factors produced by the neoplastic plasma cells activate osteoclasts, leading to bone destruction and elevated serum calcium.

Hypercalcemia can cause fatigue, depression, mental confusion, nausea, and cardiac arrhythmias. The neoplastic cells secrete abundant amounts of immunoglobulins (Ig) and their components, which are detected with serum and urine protein electrophoresis as M proteins (monoclonal immunoglobulins). In large quantities, they may cause renal failure, tissue amyloid deposition, and hyperviscosity syndrome. The most important factor in the pathogenesis of renal failure secondary to MM is Bence Jones proteinuria, which consists of light chains excreted by the neoplastic plasma cells. These chains are seen as an M spike in urine protein electrophoresis (UPEP). The most common serum monoclonal Ig (M protein) is IgG (50 percent), followed by IgA (20 percent) and light chains (15 percent). These antibodies secreted by the neoplastic

plasma cells are defective, leading to an impaired humoral immunity, making the patients susceptible to infections by encapsulated bacteria such as pneumococci. The accompanying neutropenia and impaired humoral immunity lead to increased and recurrent infections.

## 9. Conclusion

Back pain is one of the most common health problems today, and it is estimated that 80% of the population has back pain at least once in their lifetime. Thus, back pain has become a major public health problem because it is the most common cause of absence from work and a large number of sick days. There are more than a hundred different causes of back pain. The most common cause is excessive irregular and excessive physical exertion that exceeds the strength of the back muscles, ligaments and intervertebral discs. It can be hard physical work, several hours of irregular body position, and the problems are regularly caused by relaxed or overstretched muscles. Tissues that are overly tense can constrict in an instant and turn into an extremely hard and painful region with sudden severe and severe pain. Back pain can occur with a feeling of discomfort that gradually intensifies and the pain grows stronger and stronger. In the elderly, low back pain is often caused by degenerative changes in the vertebrae and intervertebral discs. It is also common in inflammatory rheumatic diseases. It can also develop in congenital curvatures of the spine, congenital developmental disorders of the spine, after injuries, various inflammations and especially in osteoporosis. The causes of back pain are numerous and therefore a thorough clinical examination is required, as well as basic laboratory tests and, if necessary, specific laboratory tests.

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