The spine in diabetes

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Do you have back ache? Over a year 15–20% of adults will have back pain, and during their lifetime 50–80% will have at least one episode of back pain. In 2014 the Global Burden of Disease Study concluded that ‘low back pain causes more global disability than any other condition’. The musculoskeletal complications of diabetes get much less attention than micro- or macrovascular disease. Yet they may trouble patients more in their daily lives. There seem to be few studies of back pain in diabetes. Among 5106 people in the NHANES study, 515 had diabetes among whom the prevalence of chronic low back pain was 19.8% vs 12.9% in those without diabetes (age-adjusted odds ratio [OR] 1.46; 95% CI 1.00–1.94). Correcting for the older age, greater obesity, lower educational levels, lower income, past smoking and reduced activity of those with diabetes still showed the increased prevalence – OR 1.39; 1.02–1.92. Hidden among the thousands of patients with back pain are some with uncommon but potentially life-changing conditions.

**Spinal infections**

People with diabetes have a greater risk of spinal infections than the general population. Suspect spinal infection if your patient has new or worsening back pain and any of these features: fever, IV access or haemodialysis, recent bacteraemia, endocarditis, IV drug abuse, or new neurological deficits. Spinal epidural abscess A 12-year-old boy had three days of central abdominal pain, vomiting, lethargy, and low back pain. He had mild lumbar spinal tenderness. Investigations revealed new diabetes with ketoadicosis which was treated. He developed widespread left-sided abdominal and flank pain with lower back and bilateral buttock pain, gradually including the left anterior thigh. MRI showed a 20cm epidural abscess from T10/11 to S1 and a left psoas abscess. *Staphylococcus aureus* was grown on blood culture.

A 54-year-old man with type 1 diabetes had had back pain for a week. His CT thoracic spine showed neither musculoskeletal problems nor evidence of infection. He developed fever and right arm paresis with leucocytosis and raised C-reactive protein. Blood cultures grew *S. aureus*. An MRI with gadolinium two days after the CT showed a spinal epidural abscess from C5 to T5.

A 2011 review suggested an incidence of spinal epidural abscess of 1.8/100 000 per year. There are an estimated two to three cases per 10 000 hospital admissions. This will vary geographically as some cases follow tuberculous osteomyelitis. Tuberculosis and diabetes often co-exist.

Symptoms of epidural abscess include fever, back or neck pain, headache, local spinal tenderness, irritability, spinal irritation, muscle weakness, incontinence, sensory deficit, paraparesis or paraplegia, and tetraparesis or tetraplegia.

In patients with spinal epidural abscess during 1954–1997, diabetes was the most common underlying condition (128/854), with skin infections as the most likely source (128/854) – most commonly *S. aureus*. Among many incorrect initial diagnoses in this series were four patients with ‘hysteria’. Mortality fell from 34% during 1954–1960 to 15% in 1991–1997. More recently, diabetes remained the most common risk factor (median 21%; range 15–46%). Back pain was reported by 75% of patients (72–100%) and 58% (17–98%) had tenderness, often severe. ‘Many patients describe the pain as “the worst they ever had”, and are able to distinguish the pain character from chronic back pain.’ In half of the patients the infection was blood-borne, usually from skin or soft-tissue infection, urine or chest infection. No source of infection was found in 30–40% of patients.

Among 128 American patients, early surgery gave the best outcomes and having diabetes predicted failure of medical treatment. The problem with spinal epidural abscesses is not treatment, but early diagnosis – before massive neurological symptoms occur. Diagnostic delays were found in 75% of patients with spinal epidural abscess. Only 13% presented with the ‘classical’ triad of fever, spinal pain, and neurological abnormalities. Among patients with delayed diagnosis, 45% had residual motor weakness compared with only 13% of patients without delay (OR 5.65; 1.15–27.71).

MRI gives the diagnosis – providing someone requests the test! Note that there may be several abscesses along the spine. Get specialist expert help immediately if you find a spinal epidural abscess.

**Vertebral infection**

Vertebral osteomyelitis may be associated with abscesses and disc space infections. Among 1008 patients, the most common underlying condition was diabetes (24%). At presentation, 86% had back pain, 60% fever, and 34% neurological deficits. Duration of symptoms to diagnosis was 11–59 days. MRI detects early infection, and problems in surrounding tissue. CT scans can detail bony destruction. *S. aureus* is the most common organism but people with diabetes may acquire unusual pathogens. Get prompt specialist advice.

In one series, 31.2% of patients with vertebral osteomyelitis had diabetes among whom 20% relapsed within a year vs 11% of those without diabetes.

**Spinal cord infarction**

At 17 weeks gestation a pregnant woman with type 1 diabetes had paraesthesiae and numbness in the lower left side of the body with movement disturbances. MRI...
showed spinal cord infarction. The baby was delivered safely by Caesarean section at 37 weeks.\textsuperscript{14}

Spinal cord infarction is rare but probably more common among people with diabetes than in the general population.

**Ventral fractures**

Spinal fractures and asymptomatic ventral fractures are more likely in people with type 1 diabetes than in those without diabetes.\textsuperscript{15}

**Spinal cord injury**

Among Canadian people with spinal cord injury, the odds ratio for type 2 diabetes was 2.45 (1.34–4.47) after adjusting for sex, age, smoking, hypertension, body mass index, daily physical activity, and fruit and vegetable intake.\textsuperscript{16} But was the diabetes secondary to the consequences of the injury or pre-existing?

Among US patients with spinal cord injury, 18/166 had diabetes; two were diagnosed during their initial admission, 16 had pre-existing diabetes. Injury from falling was similar in those with or without diabetes. However, 28\% of those with diabetes compared with 6\% of those without diabetes had a medical cause for paralysis (i.e. vascular, infectious). Five-year mortality was 41\% in those with diabetes and 16\% in those without diabetes.\textsuperscript{17}

A population-based Taiwanese study found that patients with spinal cord injury were more likely to develop type 2 diabetes afterwards (1.35 [1.22–1.45]) than people without spinal cord injury after controlling for age, sex, and comorbidity.\textsuperscript{18}

So people with diabetes appear more prone to non-traumatic spinal cord injury than others and have a worse five-year mortality; and people with spinal cord injury are more likely to develop diabetes than those without such injury.

**Spinal stenosis**

One group found that 28\% of patients with spinal stenosis had diabetes – a significantly greater prevalence than expected. This was unrelated to the presence of degenerative spondyloarthrosis.\textsuperscript{19}

**Caudal regression syndrome**

Congenital anomalies in babies of women with pregestational diabetes include caudal regression syndrome in which the sacrum and coccyx are usually absent, sometimes with lumbar anomalies. Corresponding segments of the spinal cord may be missing and some babies have femoral shortening and genitourinary problems.\textsuperscript{20}

Among babies with caudal regression, 17\% were born to women with pregestational diabetes, odds ratio 26.40 (9.88–77.64) vs those without diabetes.\textsuperscript{21}

The risk of such congenital malformations is greater in women with higher first trimester HbA1c.\textsuperscript{22}

**Summary**

People with diabetes are more likely to have back pain than those without.

‘Think about alternative diagnoses when examining or reviewing people with low back pain, particularly if they develop new or changed symptoms. Exclude specific causes of low back pain, for example, cancer, infection, trauma or inflammatory disease.’\textsuperscript{23} This NICE guidance is especially relevant in people with diabetes in whom back pain should be assessed fully, including neurological examination, especially if the patient is otherwise unwell, and in puzzling cases where infection is suspected but cannot be found.

Spinal infections such as epidural abscess and ventral osteomyelitis, ventral fractures, spinal stenosis, and spinal cord injury are all more common among people with diabetes than in those without. People with diabetes may also have worse prognosis on treatment. Failure to diagnose these conditions at a treatable stage can lead to permanent and life-changing neurological damage. Get same-day specialist advice as spinal cord damage can occur rapidly.

More research is needed in spinal disease among people with diabetes.

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**References**