Percutaneous transpedicular discectomy and drainage in pyogenic spondylodiscitis

Abstract The natural history of uncomplicated hematogenous pyogenic spondylodiscitis is self-limiting healing. However, a variable degree of bone destruction frequently occurs, predisposing the spine to painful kyphosis. Delayed treatment may result in serious neurologic complications. Early debridement of these infections by percutaneous transpedicular discectomy can accelerate the natural process of healing and prevent progression to bone destruction and epidural abscess. The purpose of this manuscript is to present our technique of percutaneous transpedicular discectomy (PTD), to revisit this minimally invasive surgical technique with stricter patient selection, and to exclude cases of extensive vertebral body destruction with kyphosis and neurocompression by epidural abscess, infected disc herniation, and foraminal stenosis. In a previously published report of 28 unselected patients with primary hematogenous pyogenic spondylodiscitis, the immediate relief of pain after PTD was 75%, and in the long-term follow-up, the success rate was 68%. Applying stricter patient selection criteria in a second series of six patients (five with primary hematogenous spondylodiscitis and one with secondary postlaminectomy-discectomy spondylodiscitis), all patients with primary hematogenous spondylodiskitis (5/5) experienced immediate relief of pain that remained sustained at 12–18 months follow-up. This procedure was not very effective, however, in the patient who suffered from postlaminectomy infection. This lack of response was attributed to postlaminectomy-discitis instability. The immediate success rate after surgery for unselected patients in this combined series of 34 patients was 76%. This technique can be impressively effective and the results sustained when applied in the early stages of uncomplicated spondylodiscitis and contraindicated in the presence of instability, kyphosis from bone destruction, and neurological deficit. The special point of this procedure is a minimally invasive technique with high diagnostic and therapeutic effectiveness.

Keywords Percutaneous transpedicular discectomy • Primary hematogenous pyogenic spondylodiscitis

Introduction

Pyogenic spondylodiscitis, particularly its primary form, may heal spontaneously or respond effectively to treatment with antimicrobial therapy. However, it is not uncommon that even while the patient is on antibiotics, the infectious process may become fulminant and serious complications may develop ranging from mechanical deformities (kyphosis-scoliosis) caused by massive bone de-
Radiculopathy with drop foot (2-3 grades out of 5) was seen in one patient, and LI-L2 in another patient, caused by epidural abscess at T8-T9 in two patients, infection (L1-L2) in one patient (Frankel C), or to severe radiculopathy paresis in three patients (Frankel C), and cauda equina manifestation.

In the first series, neurological deficit presented with intractable back pain that required narcotic pain treatment and bed rest. In the second series, sciatica was present in two patients who suffered from primary hematogenous pyogenic spondylodiscitis and was caused by purulent epidural abscess that produced neurocompressive radiculopathy of the L5 nerve root (drop foot grade 3/5 and pain).

All patients had preprocedural routine laboratory tests for infections (CBC, ESR, CRP) and imaging studies with conventional radiographs, magnetic resonance imaging (MRI) and CT scans. Technetium (Tc99) bone scan and Gallium citrate (Ga97) scan were done in 27 patients. The imaging studies were consistent with the diagnosis. All patients received a 6-week intravenous course of suitable antibiotic therapy. In patients with brucella infection, antibiotic therapy was given for 6 months. Five infections were encountered in the thoracic spine and 29 in the lumbar spine. Pain and disability was assessed using pain drawings, pain visual analogue scales and the Oswestry disability questionnaire.

The operative procedure was performed under general anesthesia in 25 patients. Local anesthesia with conscious sedation by means of fentanyl citrate (dose range, 50–200 mg) and midazolam (Versed; Rate Laboratories, Nutles, NJ, USA: dose range, 1–5 mg) was used in nine patients who were considered as high risk for general anesthesia due to septic condition or other serious medical conditions.

Three patients underwent the procedure with the use of Tony Yang discectomy instrumentation (Wolfe Corp., Germany). In 14 patients the Kambing-Craig modified biopsy discectomy procedure was used in nine patients who were considered as high risk for general anesthesia due to septic condition or other serious medical conditions.

The procedure can be performed under general or local anesthesia [13]. It is highly recommended that all aspects of the procedure be done with fluoroscopic guidance. With the patient lying prone, the operator introduces a percutaneous guide pin (2 mm Steinmann) into the pedicle caudal to the affected intervertebral disc. The pin tip is centered in the pedicle "bull’s eye" on an oblique fluoro-