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Original article

Clinical efficacy of CT-guided percutaneous huge ilio-psoas abscesses drainage combined with posterior approach surgery for the management of dorsal and lumbar spinal tuberculosis in adults

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ABSTRACT

Purpose: To evaluate the clinical efficacy of CT-guided percutaneous huge ilio-psoas abscesses drainage combined with posterior approach surgery for the management of dorsal and lumbar spinal tuberculosis in 16 adult cases.
Methods: Between January 2006 and June 2013, a total of 16 dorsal and lumbar spinal tuberculosis patients with huge ilio-psoas abscesses underwent two-stage CT-guided percutaneous abscesses drainage and posterior debridement, decompression, intervertebral fusion and instrumentation. Standard quadruple antituberculous chemotherapy was performed both before and after surgery.
Result: The average follow-up period was 26.7 months (range: 18–38 months). There is no severe complication and relapse of spinal tuberculosis. The blood loss was 921.0 ± 141.3 mL, operation time was 174.8 ± 15.7 minutes. Kyphotic angle improved from 36.6 ± 10.0° preoperatively to 8.1 ± 1.8° postoperatively with 2.2 ± 1.5° loss of correction at final follow-up. The solid bone fusion was achieved in all cases at average 6.6 ± 2.2 months after surgery. Neurologic deficits were recovered in varying degrees except 4 cases remained the same. The postoperative quality of life significantly improved. The Oswestry Disability Index (ODI) decreased from 32.8 ± 10.6 preoperatively to 14.4 ± 7.9 at the final follow-up.
Conclusion: CT-guided percutaneous drainage combined with posterior approach surgery was proved to be safe and effective for the management of dorsal and lumbar spinal tuberculosis with huge ilio-psoas abscesses in adults.
Level of study: Level IV, retrospective.

1. Introduction

Despite the remarkable achievements since the advent of antituberculous drugs, tuberculosis (TB) remains a global public health problem, especially in the undeveloped and developing countries [1,2]. Spinal TB, also called Pott disease, is the most common form of the extrapulmonary TB, accounting for almost 50% of cases of osteoarticular TB [2–5]. Spinal TB abscesses is more common compared with other spondylitis. Once the abscesses penetrate the periosteum, the pus will spread along the anatomic spaces under the action of gravity [6]. In terms of dorsal and lumbar spine, abscesses usually spread to the ilio-psoas muscle. Although there is still controversial about surgical indications, it is widely accepted that patients with spinal cord compression, considerable bony sequestra, progressive deformity and instability need surgical intervention [7,8], So far, anterior, posterior and combined anterior-posterior approaches have been described for treating dorsal and lumbar TB combined with huge ilio-psoas abscesses, there is still no optimal surgical approach because of the respective drawbacks. In recent years, Computed tomography (CT)-guided percutaneous abscesses drainage has been introduced as a new approach in the management of spinal TB abscesses [9,10]. But for some severe patients, only drainage of abscesses is not enough. In this paper, we retrospectively studied 16 adult dorsal and

Abbreviations: TB, Tuberculosis; CT, computed tomograph; MRI, magnetic resonance imaging; HIV, Human Immunodeficiency Virus; CRP, C-reactive protein; ESR, erythrocyte sedimentation rate; ODI, Oswestry Disability Index.

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Table 1
General data of the patients.

Case no.	Sex/Age (y)	Level	OT (min)	BL (mL)	ESR (mm/h)		CRP (mg/L)		KA (°)			FG		ODI		FU (mon)	F (mon)
					BT	FFU	BT	FFU	Pre	Post	FFU	Pre	FFU	Pre	FFU		
1	M/36	L1-2	145	738	78	15	18	7	38	9	11	D	E	36	8	32	6
2	M/47	L2-3	162	862	54	11	22	3	46	7	12	C	D	45	27	26	5
3	F/57	L3-4	168	913	82	16	14	9	33	9	10	E	E	16	7	18	12
4	M/26	T12-L1	157	818	35	9	8	6	27	6	7	D	E	32	9	24	5
5	F/46	L2-3	182	1020	70	16	19	2	54	12	16	C	E	43	11	28	8
6	F/20	L4-5	152	926	66	11	16	6	37	11	12	D	E	30	12	34	4
7	M/40	L1-2	168	821	77	13	26	8	40	8	12	C	D	42	24	25	6
8	M/46	L4-5	197	1132	102	16	46	8	10	7	7	D	E	21	6	18	8
9	F/33	T12-L1	181	1268	60	8	17	6	36	8	10	D	D	31	22	31	8
10	F/47	L1-2	165	830	66	10	11	5	33	6	7	E	E	18	7	27	10
11	M/36	L4-5	193	926	58	10	19	6	42	9	12	C	E	43	25	24	6
12	M/31	L3-4	185	882	28	14	23	2	45	7	10	C	E	44	15	19	5
13	F/41	L1-2	176	795	79	12	18	7	28	6	7	D	E	31	12	27	6
14	M/45	T12-L1	192	1061	61	11	11	3	40	9	11	D	E	29	10	32	8
15	F/28	L4-5	184	780	82	8	20	5	32	7	8	E	E	17	8	36	4
16	M/22	L2-3	190	964	94	18	16	6	44	9	13	C	E	46	28	25	5

M: male; F: female; y: year; min: minute; ESR: erythrocyte sedimentation rate; CRP: C-reactive protein; KA: kyphotic angle; FG: Frankle grade; ODI: Oswestry Disability Index; FU: follow-up; F: fusion; m: month; BT: before treatment; FFU: final follow-up; Pre: preoperative.

lumbar spinal TB patients associated with huge ilio-psoas abscesses. The purpose was to assess the clinical efficacy of CT-guided percutaneous abscesses drainage combined with posterior approach surgery.

2. Materials and methods

2.1. Patient information

Written informed consent was obtained from each patient and this study was approved by Ethics Committee of Yan Taishan Hospital.

A total of 16 consecutive adult dorsal and lumbar spinal TB patients associated with huge ilio-psoas abscesses were included in this study. All patients were treated with two-stage CT-guided percutaneous ilio-psoas abscesses drainage and posterior approach surgery between January 2006 and June 2013. There were 9 males and 7 females. Their ages ranged from 20 to 57 years, with an average age of 37.6 ± 10.4 years. Of the 16 patients, 10 had bilateral ilio-psoas abscesses, and the remaining 6 had unilateral ilio-psoas abscesses. The involving spinal segments ranged from T12 to L5. Neurological deficits were assessed according to the Frankle grading, Grade B in 1, C in 5, D in 7, and E in 3 patients. The preliminary diagnosis of spinal TB was made based on clinical presentation, laboratory examinations and imaging findings including X-ray film, computed tomography (CT) scan, and magnetic resonance imaging (MRI). Preoperative kyphotic angle was 36.6 ± 10.0° (range: 10–54°). The Oswestry Disability Index (ODI) score, erythrocyte sedimentation rate (ESR), C-reactive protein (CRP) of patients were 32.6 ± 10.6, 68.3 ± 19.4 mm/h, 19.0 ± 8.6 mg/L, respectively (Table 1). The patients with multilevel (>2 adjacent vertebrae) involvements, active lung TB and positive HIV were excluded from this study.

2.2. Preoperative preparation

The standard quadruple antituberculous chemotherapy was initiated (isoniazid 300 mg daily, rifampin 600 mg daily, ethambutol 20 mg/kg daily and pyrazinamide 25 mg/kg daily) for 2–4 weeks before the surgery. When the constitutional symptoms improved, and ESR and CRP significantly decreased, the surgery could be performed.

2.3. Surgical strategy

2.3.1. First stage: CT-guided percutaneous ilio-psoas abscesses drainage

The patient was placed in the prone position on the examination table, then CT scan was done to measure the depth, angle and distance from the skin to each abscesses. The catheters were inserted using the Seldinger technique under local anesthesia. According to the catheter size, proper dilatation was performed, and 8.5 F drainage catheter was inserted into abscesses cavity, then the abscesses was drained and were sent for culture. The other abscesses were drained using the same method. In this study, it is only rough estimated under CT scan that single abscesses volume was more than 100 mL, the drainage catheter was considered to be placed. All patients went on the systemic antituberculous chemotherapy, meanwhile the abscesses were aspirated and irrigated with saline solution (5–10 mL) and isoniazid (200 mg) twice a day. The duration of draining ranged from 5 to 12 days (mean 7 days). When the single drainage volume was under 10 mL/24 hours, catheters could be removed. But before doing that, a follow-up CT scan was performed to make sure the there were no huge abscesses remaining.

2.3.2. Second stage: posterior approach surgery

The surgery was performed 1 week later after the last drainage catheter was removed. The patients were placed in the prone position and operated on under general anesthesia. The pedicle screws were inserted into the vertebrae (1 or 2 levels above and below the lesion). Then the unilateral lamina, zygapophyseal joint and transverse process were removed on the severe side of the infected vertebrae. This approach could provide the vision exposure up to 270°, the necrotic disc, sequestra, abscesses, caseous granulation tissue were removed until to healthy bleeding bone with various curettes. Subsequently the kyphosis was slowly and carefully corrected with the help of internal fixation instrument. A strut autograft iliac bone was inserted to bridge the gap and offer support after debridement. For most patients, unilateral exposure was enough, if necessary, other side was treated in the same way. The local antibiotics therapy with 1.0 g of streptomycin was administrated and a local drainage tube was inserted. Specimens obtained during the operation were sent to histopathologic examination (Fig. 1).

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