Original Research Article

Effectiveness of Transpedicular Biopsy for Spinal Lesion performed under 2D fluoroscopic guidance

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Abstract

Transpedicular biopsy is becoming gold standard test for appropriate tissue diagnosis for vertebral body lesion. Most of central vertebral body lesion can be approached via transpedicular route under fluoroscopic guidance under local anaesthesia. This route is safe, efficient, cost and can be performed as day care procedure . We were able to establish appropriate diagnosis in 57/65 (87.69%) patients which is comparable other studies.

Keywords: Biopsy, spinal disorder, lesion.

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Introduction

Tissue diagnosis is paramount in most of spinal disorder to simplify treatment algorithm like vertebralosteomyelitis, metastatic lesion and various nonspecific radiological lesion. Open biopsy is not recommended as a first line in vertebral lesions. Percutaneous biopsy for spine by various different approaches or routes described earlier with its pros and cons. Use of fluoroscopy vs computer tomography depends availability of resources and cost effectiveness In the past needle biopsy using paraspinal approach was used commonly and were associated with complications like pneumothorax, nerve injury, haematoma[1,2] led to development of transpedicular biopsy technique by Duncan et al in 1928 now days being used as routine procedures by orthopaedicians[3]. For spinal lesions involving vertebral bodies transpedicular technique seems to be very useful for bacterial and histo-pathological examination as it had advantages like day care procedure, easy to perform, minimal soft tissue injury for desired sample and that to with less complications[4-6].

With time increased familiarity with morphology of vertebral body closed biopsy for spinal lesions being preferred over open biopsy. Though many vertebral body pathologies have characteristic appearance on radiological investigations (Radiograph, CT-scan and MRI), But for definitive management of underlying pathology bacteriological and histopathological examinations become mandatory ,that's how technique of transpedicular biopsy for spinal lesions become popularized.

High sensitivity and specificity was seen with transpedicular technique.

The aim of our study was to determine the effectiveness of transpedicular biopsy procedure under fluoroscopy and its complications.

Materials and Methods

This prospective study was conducted in Department of Orthopaedics in a tertiary health care centre from 1st January 2018 to 31st November 2021. A total of 65 patients (41 males and 24 females) with vertebral body lesions like pathological fractures, lytic and destructive pathology around dorso-lumbar region were included in our study.

In all, 65 patients with vertebral body lesions, 36 dorsal and 29 lumbar biopsy were performed using transpedicular technique.

Technique

Prone position was used for all biopsies and was performed under local anaesthesia or intra-venous sedation. Anterior-posterior and lateral view was seen in fluoroscopy for marking the pathological level. We used 11G, 10 cm long needle with graduated marking. Thereafter, stab incision was given and deepening was done with artery forceps. Entry in the pedicle was made using biopsy needle under the fluoroscopy. Thereafter lateral view was used to confirm the correct position for reaching the pathology. Preference of side (left vs right or both) was decided based upon preoperative imaging. First core biopsy were taken later aspiration were made with leur lock syringe to improve sensitivity of representative disease Sample obtained was sent for pus culture and antibiotic sensitivity and histopathological examination. Neurological status was unchanged after biopsy procedure. Patients were discharged after 24 hours of observation.

Table-1: Level

S. No	Level	Radiograph	Histo-pathological examination
1.	Thoracic	Lytic(9)	Infection(21)
		Wedge(7)	Osteoporotic collapse(3)
		Destructive(6)	Metastasis(7)
		Erosive(2)	Multiple myeloma(1)
		Discitis(1)	Plasmacytoma(1)

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2.	Lumbar	Lytic(13)	Infection(9)
		Wedge(14)	Osteoporotic collapse(5)
		Destructive(9)	Metastasis(5)
		Erosive(4)	Multiple myeloma(2)
		Discitis(4)	Plasmacytoma(1)

Results

A total of 65 patients (41 males, 24 females) were included in our study. The average follow-up of each case was one year.

Adequate sample was collected in all the patients. Preoperative digital radiographs showed 21 wedge shaped lesions, 18 lytic lesions, 15 destructive lesions, six with erosion of end-plates and five discitis.

Diagnosis was made in 57 patients out of 65. Histopathological examinations showed 27 samples with infection (18 with tuberculosis and nine with bacterial infection), osteoporotic

Collapse in 12, metastasis in nine, multiple myeloma in three samples and plasmacytoma in two patients. In remaining eight patients samples were reported as chronic inflammation and diagnosis was not conclusive.Patients were followed up for minimum period of one year. There were no complications after procedure.

Discussion

Use of Transpedicular biopsy for spinal lesion well established method of confirmative tissues diagnosis of various spinal lesion. Although clinico radio logical correlation of patient clinical presentation, biochemical marker and pertinent radiological findings on Magnetic resonance images is essential to reach any conclusive diagnosis .Establishment of organism type is more important than just a diagnosis its utility is more in vertebral osteomyelitis for sensitive antibiotic regimen. In non-infective vertebral body collapses differentiation between osteopathic vs metastatic collapse is important for further treatment. Many a time diagnosis of tumour cell type and its disease activity is useful for correct treatment. Radiologicalmasquerade differentiation can be done by appropriate sample from lesion .Timely diagnosis Nonspecificbenign lesion helps patient to avoid ;long term morbidity In past open procedures where used as ample amount of sample was obtained for diagnosis, but was associated with complications of blood loss, superadded infections.

Nowadays, transpedicular biopsy becomes choice for spinal lesions involving vertebral bodies in comparison to paraspinal biopsy procedure as less complications are seen and being day care procedure, cost-effective is another advantage for transpedicular technique.

In present study sample from vertebral body was collected using C-arm guidance which had advantages like less radiation exposure, aseptic conditions in operating room, cost-effective procedure[7].

Chances of complications like nerve root or vessel injury arise in case of medial and inferior wall breech of pedicle[8].

Renfrew et al[9]. recommended CT-guided percutaneous transpedicular biopsy of the spine, when the location of a vertebral body lesion does not allow easy access by means of the posterolateral approach but now a days availability of high resolution fluoroscopy and better preoperative planning obviate need of CT Scan

In present study none of the above mentioned complications with transpedicular or paraspinal approach were encountered.

As only imaging is not a full proof method to differentiate between simple osteoporotic vertebral compression fracture and fracture due to secondaries , so transpedicular biopsy and aspiration is routinely obtained while performing percutaneous vertebroplasty many authors have reported malignancy in benign looking fractures

Kim et al[13] was successful to find appropriate diagnosis in 134/170 (78.8 %) Dave et al[14], 63/71(88.73%) and Pierot[15]et all established accurate diagnosis in 16/18 (89 %) patient in their small study of thoracolumbar spine whereas in present study 57/65 (87.69%) patients diagnosis was confirmed. So effectiveness of our study is comparable to previous reported literature

Conclusion

Transpedicular biopsy of for vertebral body lesions is a safe and efficient. Feasible to perform as day-care procedure and under fluoroscopy make it very cost effective. Use of local anaesthesiaat incision site only provides continuous nerve root functionmonitoring to prevent nerve injury. Timely tissue diagnosis, organism identification and sensitivity pattern establishment can reduce morbidity and improve quality of life.

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