

Original

**THE VALUE OF PERCUTANEOUS NEEDLE BIOPSY IN THE  
DIAGNOSIS OF LYTIC LESIONS OF THE SPINE**

Salem Al-Zahrani, FRCS\* Mohammad Arshad Ikram, FRCS\*\*  
Mamoon Kremli, FRCS\*\*\* Munir Saadeddin, FRCS\*\*\* Najj Thabit,  
MD\*\*\*\*

The aim of this paper is to evaluate the value of percutaneous needle biopsy in the diagnosis of lytic lesions in the spine.

Over a five-year period, 47 percutaneous needle biopsies were performed on 45 patients for lytic lesions shown by plain radiography in one or more vertebrae. There were 24 lesions in the dorsal, 19 in the lumbar and 4 in the cervical spine. A variety of pathological conditions were found which included tuberculosis, brucellosis, tumour metastasis, myeloma and non-specific infections. Of the 47 biopsies, there were 39 positive results, 6 unreliable and 2 were negative where no pathology was found. The reliability of the biopsy was assessed either by further specimens taken during the operation for treatment of the lesion or by the result of the treatment during the follow-up period.

The accuracy of diagnosis in the present study was found to be 83%. No major complications were encountered in this series.

The vertebral bodies are frequently the site of many pathologically lesions. A definitive diagnosis is often difficult to establish on the basis of clinical features, laboratory and radiological investigations.

In 1935 Robertson and Ball<sup>1</sup> devised a technique of vertebral needle biopsy which has been refined by many other workers<sup>2,3</sup>. In 1954, Ackerman<sup>4</sup> performed the first vertebral trephine biopsy and in 1963 published the first important series of percutaneous trephine biopsy with 46 cases involving vertebrae from T3 to T10<sup>5</sup>.

-----  
\* Associate Professor & \*\*\*\* Specialist  
Consultant Orthopaedic Surgeon Orthopaedics  
\*\* Senior Registrar Department  
\*\*\* Assistant Professor & Riyadh Central  
Consultant Orthopaedic Surgeon Hospital  
Division of Orthopaedics Riyadh  
King Khalid University Hospital Saudi Arabia  
Riyadh, Saudi Arabia

In 1956, Craig<sup>3</sup> performed percutaneous biopsy on five patients with thoracic and lumbar lesions. In 1969, Ottolenghi published his experience on 1,078 biopsies<sup>2</sup> of vertebral bodies and improved the technique described earlier in 1948 in collaboration with Valls and Schajowiez<sup>6</sup>.

We report the result of 47 vertebral biopsies performed by the technique described by Ottolenghi. The purpose of presenting the results is to assess the reliability of percutaneous biopsy in the diagnosis of lytic lesions of the spine.

METHODS

Records of 45 consecutive patients with 47 lytic lesions in the spine on whom percutaneous needle biopsy had been performed at Riyadh Central Hospital between June 1985 to May 1990 were reviewed.

Back pain was a common symptom in all patients. Laboratory investigations which included ESR, white cell count, tuberculin test, brucella titre, rheumatoid factor and Bence Jones protein were done as a routine for all patients.

Radiological investigations which included plain x-rays, CT scan and isotope bone scan were also performed on all patients. Myelography was done on five patients who presented with neurological signs.

Percutaneous needle biopsy was performed using the technique described by Ottolenghi<sup>2</sup>. General anaesthesia was used in all cases. Of these 24 biopsies were performed in thoracic, 19 in lumbar and 4 in cervical regions.

The results were classified as positive, unreliable or negative. The result was considered positive when the diagnosis was confirmed either by subsequent surgery or by the clinical course of the patient. A negative result was noted when no pathology was found, and an unreliable result when histological diagnosis could not be reached definitively.

#### RESULTS

Table 1 show the age and sex distribution of the 31 males and 14 females. Their ages ranged from 6 years to 74 years old (mean 39.1 years).

Table 1: The age and sex distribution

Age (years)	Male	Female
0 - 10	1	-
11 - 20	2	-
21 - 30	11	2
31 - 40	5	3
41 - 50	6	4
51 - 60	4	3
> 60	2	2
Total	31	14

The overall results were 83% positive, 4.2% negative and 12.7% unreliable. A broad spectrum of pathological conditions were recorded (Table 2).

Table 2: Results of 47 biopsies

Result	No		Percentage
	Individual	Total	
Diagnostic:			
Tuberculosis	21		
Brucellosis	4		
Non-specific infection	6		
Metastases	6		

Multiple myeloma	2	39	83
No pathology		2	4.2
Not reliable		6	12.8
-----			
Total		47	100.0
-----			

In the six unreliable cases, the procedure was repeated. Two cases proved to have tuberculosis and one a healed haemangioma. One patient underwent anterior decompression because of neurological involvement and proved to be tuberculosis by open biopsy.

All patients were followed up from 12 to 40 months (mean 26). No complications were encountered in this series.

#### DISCUSSION

Percutaneous needle biopsy is used in cases of vertebral lesions when accurate histological diagnosis is required to distinguish between malignancy, different types of infections and other diseases. It has the advantage of being simple, minimally invasive procedure, providing an adequate specimen for histological diagnosis<sup>7</sup>.

The technique is simple but needs proper positioning of the patients with accurate localisation of the lesion in both anteroposterior and lateral radiographs with the aid of an image intensifier. Our data shows that a definitive diagnosis with follow-up confirmation was established in 83% of procedures. These results are comparable with those of Ottolenghi et al<sup>8</sup> where positive diagnosis was seen in 73% and Loreda and Bard<sup>9</sup> where the accurate diagnosis was reached in 77.5% of biopsies.

In the diagnosis of tumour metastases in the vertebral bodies a high success rate has been reported by many authors<sup>10,11</sup>.

More simple and non-invasive investigations such as white cell count, erythrocyte sedimentation rate, tuberculin tests and brucella titre were non-specific and could not be relied upon to make an accurate diagnosis. ESR in our series was non-specific, though Fyfe et al<sup>7</sup> suggested ESR as a reliable parameter for active lesions of vertebrae.

#### CONCLUSION

Percutaneous needle biopsy is a minor invasive procedure, providing an adequate specimen for histological diagnosis and causing no interference with subsequent therapy. However, it needs special skills to be developed and needs to be interpreted by an experienced bone pathologist. Once these requirements are available, this valuable investigation can be performed early for the diagnosis of lytic lesions of the spine.

#### REFERENCES

1. Robertson RC, Ball RP. Destructive spine lesions: Diagnosis by needle biopsy. J Bone Joint Surg 1935;17:49-58.
2. Ottolenghi CE. Aspiration biopsy of the spine: Technique for the thoracic spine and results of twenty-eight biopsies in this region and overall results of

- 1050 biopsies of other spinal segments. J Bone Joint Surg 1969;51-A:1531-44.
3. Craig FS. Vertebral-body biopsy. J Bone Joint Surg 1956;38-A:93-102.
  4. Ackermann W. Vertebral Trephine biopsy. Ann Surg 1956;143:373-85.
  5. Ackerman W. Application of the trephine for bone biopsy results in 635 cases. JAMA 1963;184:11-17.
  6. Valls J, Ottolenghi CE, Schajoweiez F. Aspiration biopsy in diagnosis of lesions of vertebral bodies. J Am Med Assoc 1948;136:376-82.
  7. Fyfe IS, Henry AJ, Mulholland RC. Closed vertebral biopsy. J Bone Joint Surg 1983;65-B;140-3.
  8. Ottolenghi CE, Schajoweiez F, De Shant FA. Aspiration biopsy of the cervical spine: Technique and results in thirty-four cases. J Bone Joint Surg 1964;46-A:715-33.
  9. Laredo J, Bard Y. Thoracic Spine: Percutaneous Trephine Biopsy. Radiology 1986;1660:485-9.
  10. Tehranzadec J, Freiburger R, Ghelman B. Closed Skeletal needle biopsy. AJR 1983;140:113-5.
  11. De Santos LA, Murray JA, Ayala AG. The value of percutaneous needle biopsy in the management of primary bone tumours. Cancer 1979;43:735-44.