FLUOROSCOPY-GUIDED TRANSPEDICULAR TROCAR BIOPSY OF THE SPINE — RESULTS, REVIEW, AND TECHNICAL NOTES

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The purpose of this study was to evaluate the technique and value of fluoroscopy-guided percutaneous transpedicular trocar biopsy in obtaining diagnostic tissue from vertebral body lesions and to review the current literature. The bone cores from 32 patients who underwent 34 transpedicular Jamshidi trocar biopsies for lesions in the thoracic, lumbar and sacral spine were examined. All samples were examined macroscopically for length and breakage and microscopically for trabeculae, marrow, and artifacts. Each sample was graded for its value for histologic examination. The diagnostic accuracy was assessed by the patient's clinical course and follow-up examinations. In 30 (93.8%) of the 32 patients a confirmed diagnosis or exclusion of pathology could be made. In 31 (91.2%) of 34 biopsies the quality of the specimen was assessed as "excellent". Two (5.9%) specimens were "good" and one (2.9%) was "poor". There were two minor complications (5.9%). Transpedicular biopsy of the spine using a Jamshidi trocar with an internal diameter of 3.1 mm under fluorscopic guidance can be performed safely and efficiently and provides suitable bone cores for histologic examination. A combined clinical, radiological and pathological approach to the lesions leads to an excellent diagnostic yield.

Keywords : biopsy ; vertebral body ; transpedicular.
Mots-clés : biopsie ; corps vertébral ; transpédiculaire.

INTRODUCTION

Often in spinal lesions, the clinical and radiological features, results of laboratory tests and even of specialized investigative techniques are nonspecific. Therefore confirmation of pathologic tissue changes is required before commencing appropriate therapy. This can only be accomplished by means of a biopsy. Since modern medical, surgical, and radiation therapy are both specific and complex, as well as having associated risks, tissue diagnosis has become even more important for adequate treatment.

In 1935 Robertson and Ball introduced percutaneous needle biopsy of the spine (47). Subsequent reports have described vertebral biopsy both without (1, 3) and with (16, 33, 42, 52) radiographic as well as CT-guidance (3, 7, 9, 10, 11, 23, 37). In 1990 Fidler and Niers performed open transpedicular biopsy of the spine (20). Subsequent radical resection of tumors includes *en bloc* removal of the lesion, hematoma, and biopsy tract. Fidler and Niers (20) believed that the shorter tract created with a transpedicular biopsy was easier to resect than the longer and more obliquely oriented tract created with biopsy by means of the conventional posterolateral approach which is widely used (7, 22, 52).

Recently, this relatively new approach using a needle or a trocar has gained increasing popularity for the diagnosis of many vertebral lesions in the thoracic and lumbar spine (27, 44, 46, 53, 56). In contrast to iliac crest biopsy trocars, there is still a

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lot of controversy as to what size an ideal trephine should have to be safe and to deliver a sufficient vertebral bone core for an adequate histologic analysis and whether CT or fluoroscopic guidance should be used.

The purpose of this study is to determine the safety, histologic specimen quality and diagnostic value of percutaneous transpedicular trocar biopsies using a Jamshidi trocar (26) with 3.1-mm internal diameter under fluoroscopy guidance. In addition the current literature is reviewed, and the technique is described.

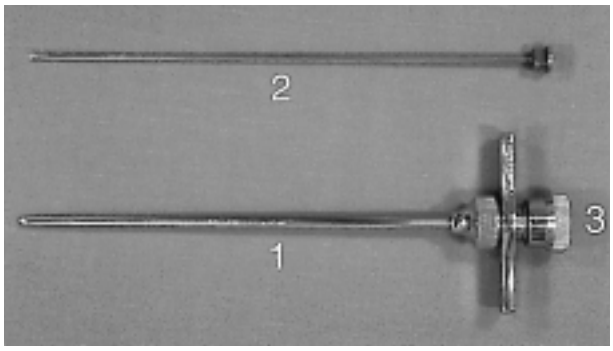

Fig. 1. — The Jamshidi trocar. Cutting trocar (1) with a tapered distal centimeter and a device smooth cutting edge ; stylet (2) for trocar introduction and penetration of soft tissues ; comfort cap (3) for facilitating the application of pressure during entry of the cutting trocar into bone.

MATERIAL AND METHODS

Patients

For 32 patients 34 transpedicular biopsies were performed in the thoracic, lumbar and sacral spine (table I). Nineteen (59.4%) patients were men and 13 (40.6%) women ; the mean age of the patients was 58.4 years (range 14 to 91 years). Thirty patients were biopsied once, and 2 patients had a repeat biopsy. A total of 33 vertebrae were involved, and the transpedicular biopsy sites include T1-4 (n = 1), T5-8 (n = 3), T9-12 (n = 9), L1-5 (n = 19), S1 (n = 2).

Preparation and indications

Prior to the biopsy conventional xrays, bone scans and MRI were available in all cases. In selected patients additional CT-scans were performed. The decision to undertake percutaneous transpedicular biopsy was made in a clinical conference with radiologists, orthopedic surgeons and bone pathologists. The only absolute contraindication was an abnormal and uncorrected bleeding or clotting time.

Technique

The biopsies were performed by orthopedic surgeons with a special interest in spinal disorders. In the majority of the patients (71.9%) the procedure was carried out under general anesthesia. With increasing experience it was possible to perform biopsies in selected patients (28.1%) with local anesthesia. All biopsies were obtained by a percutaneous transpedicular approach. A Jamshidi trocar and cannula (26) (Allegiance Healthcare, Unterschleißheim, Germany) with an internal diameter of 3.1 mm was used (fig. 1). The procedure can be performed with the patient in a prone or lateral position. The radiological anatomy of the pedicle must always be visible. The stepwise procedure is shown in fig. 2. First, the image intensifier was oriented in a perfect AP-direction. The trocar was positioned at the base of the transverse process and angled 10 to 20° medially with its tip in the center of an imaginary second oval exactly lateral to the true oval pedicle image. Under lateral fluoroscopic guidance the trocar was adjusted in a cephalocaudad direction and pushed forward through the entire pedicle until the dorsal wall of the vertebral body was reached. In the AP-direction the tip of the trocar should then be in the center of the true oval pedicle image. The sharp trocar was removed and the trephine advanced by hand until the anterior cortex was reached. The use of a mallet should be avoided. After a counterclockwise rotation the trephine was removed and the specimen obtained was pushed out with a blunt trocar. Only if bleeding was expected (e.g. in case of hemangioma) was a small drain inserted. After the procedure all patients were allowed up as tolerated.

Histological evaluation of the bone cores

Fig. 3 presents the algorithm used in the macroscopic and microscopic evaluation of the samples.

Preparation of bone cores and macroscopic evaluation

The unfixed biopsy material came directly to the Department of Bone Pathology at our institution. As a routine whenever purulent material was obtained or

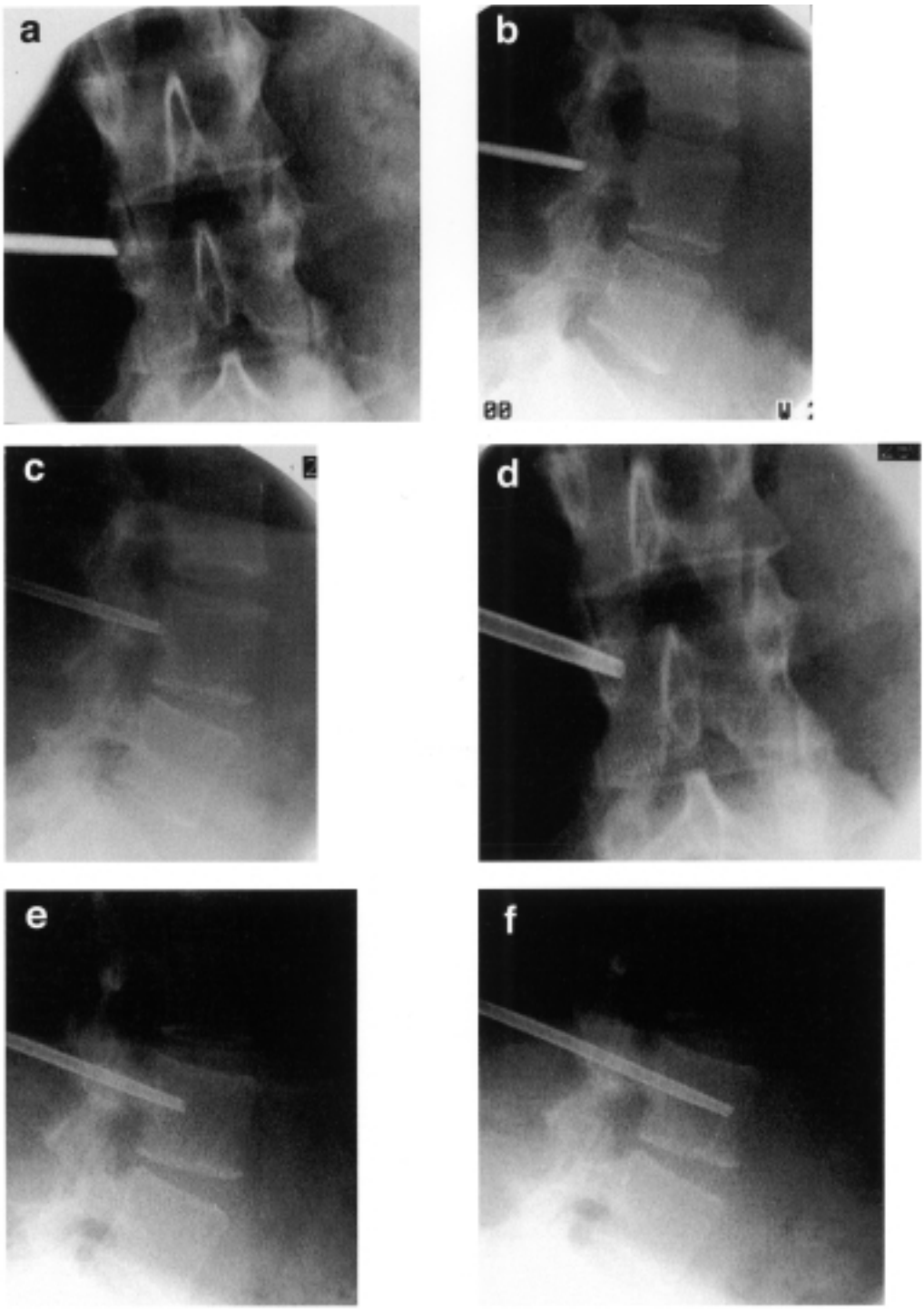

Fig. 2. — Hard-copy reproductions from image-intensifier during percutaneous transpedicular biopsy at L3. (a) Perfect anteroposterior view of the first step. The trocar is positioned at the base of the transverse process. (b) In the lateral view the trocar is adjusted in the sagittal plane. (c) The trocar is pushed forward through the pedicle until the vertebral body is reached. (d) Back in the anteroposterior view the trocar must now be in the center of the pedicle. (e, f) In the lateral view the trephine is advanced into the vertebral body without violating the anterior cortex.

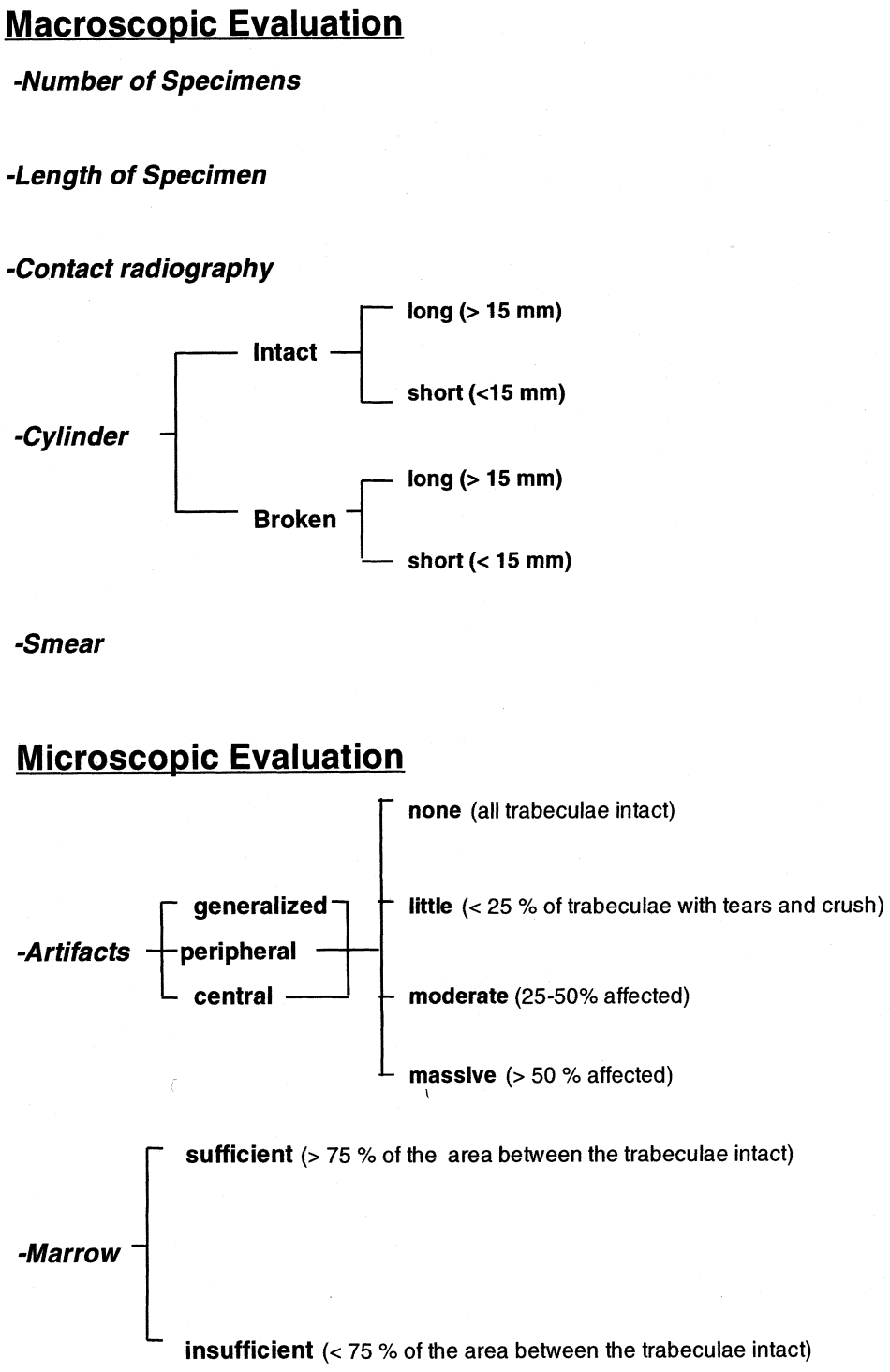

Fig. 3. — The algorithm used in the macroscopic and microscopic evaluation of the samples.

infection was suspected, a specimen was also sent to the microbiology laboratory for smear, culture, and sensitivity tests. Before preparation the number of specimens per biopsy and the length of each specimen was recorded. Samples less than 15 mm in length were designated "short", and those more than 15 mm in length were designated as "long". The specimen was described as "cylindrical" if the original shape of bone was recognizable, or as "smear" if it was not. Cylindrical specimens were divided further into "intact" or "broken". After contact radiography, each specimen was divided perpendicular to the longitudinal axis in two equal halves. The half with cortical bone was embedded undecalcified in methylmethacrylate. The other half was decalcified in ethylenediaminetetraacetic acid (EDTA) and embedded in paraffin. The specimens embedded in paraffin were stained with hematoxylin and eosin ; the specimens embedded in acrylate were stained with toluidin blue. Whenever needed additional stains or immunohistochemical stains were performed. In 11 biopsy procedures imprint cytology and a frozen section were requested and performed immediately on the fresh specimen.

Microscopic evaluation

The lowest magnification (25 ×) was used for gross study of the slides ; details were examined under more powerful magnifications. The quality of artifacts was recorded as "none" if all trabeculae appeared intact and microfractures, tears, or overlaps could be avoided, as "little" if less than 25% of the trabeculae showed tears and crush, as "moderate" if 25-50% of the trabeculae were affected, as as "massive" if more than 50% of the trabeculae were damaged. The localization of artifacts was described as generalized, peripheral, or central. Bone marrow was classified as "sufficient" if more than 75% of the area between the trabeculae appeared intact. If less than 75% of the area between the trabeculae was recognizable, the specimen was defined as "insufficient".

Assessment of biopsy quality

Following the macroscopic and microscopic evaluation, the value of each specimen as a whole for histologic diagnostic was appraised. Three classes were defined : "excellent", "good", and "poor".

"Excellent" samples were defined as those with well-unequivocal-preserved structures in which few or no artifacts would give an histologic diagnosis. Macroscopically (fig. 4a, b), these samples appeared as intact cylinders ; microscopically (fig. 4c), they had sufficient marrow, and no more than moderate peripheral artifacts.

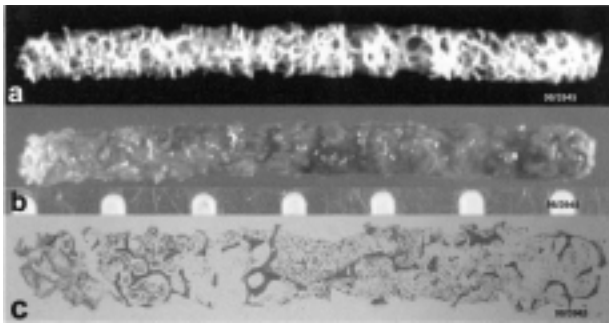

Fig. 4. — Example of an excellent 3-cm long bone core. Contact radiograph (a) and macroscopic picture (b) showing an intact cylindrical shape ; the specimen represents the full length of bone sampled and is not broken. Section (c) of the biopsy specimen with intact trabecular architecture and sufficient marrow (undecalcified ; Goldner ; 7×). The trabeculae have normal thickness and do not show tears and crush artefact.

Samples of "good" value permitted a histologic diagnosis, but the samples had moderate generalized or massive peripheral artifacts.

"Poor" samples were classified as those in which artifacts or insufficient material excluded the possibility of arriving at a diagnosis. These samples appeared as smears with insufficient marrow and massive generalized artifacts.

Diagnostic evaluation

The slides were examined consecutively by two specialized pathologists. Three types of opinions were rendered : A definitive pathologic diagnosis was given, the specimen was considered normal or free of tumor, or the specimen was regarded as inadequate or possibly pathologic. The diagnostic accuracy of the biopsy was determined by correlation with the histologic material obtained at subsequent surgery in those cases where surgery was performed. In others, accuracy was confirmed by the patient's clinical course and response to therapy and follow-up within at least 6 months after the biopsy.

RESULTS

Macroscopic examination

On average 1.4 specimens were obtained per biopsy (range, 1 to 4 specimens). The average length of all specimens was 20.4 mm (range, 10 to 40 mm). The average length of the longest specimen of each biopsy was 23 mm. In all 34 (100%) biopsy samples the original cylindrical form of the bone core was recognizable. Only one sample (2.9%) was completely broken.

Microscopic evaluation

The great majority (76.4%) of the 34 samples showed only few artifacts resulting from the biopsy technique. Thirty two samples (94.1%) were classified as containing sufficient marrow. Most artifacts (73.5%) of the samples were located peripherally. In three samples (8.8%), generalized and in two samples (5.9%) central artifacts were found. Moderate artifacts were noted in 8.8% (3) of the samples and massive artifacts in 2.9% (1). Four samples (11.8%) had no structural alterations resulting from the biopsy technique.

Assessment of biopsy quality

An excellent sample for histopathological evaluation was obtained from 31 (91.2%) of the 34 biopsies. Two (5.9%) were considered of good value. One sample (2.9%) was poor.

Histological diagnoses

The results of the biopsies are shown in table I. Specific diagnoses including exclusion of malignancies, inflammation and metabolic diseases (normal or free of tumor) were established in 94.1% (32) of the 34 biopsies and 93.8% (30) of the 32 patients. In the 24 (75%) patients with pathologic findings the diseases studied included 10 malignancies, 3 isolated osteoporotic fractures, 9 cases of acute or chronic osteomyelitis and one case each of hemangioma and osteomalacia. Six (18.8%) patients had samples that were normal or free of tumor or sterile cultures. One (3.1%) patient had a possibly pathologic sample because of suspected lymphoma and is currently followed clinically. In one (3.1%) case the sample obtained was inadequate. There were no false-positive diagnoses. When inadequate samples were excluded from evaluation, a diagnosis was possible in 96.8% of 31 patients. In 8 (72.7%) of the 11 cases with biopsy procedures including imprint cytology and frozen section, the definitive diagnosis was established within 20 minutes. In the remaining three (27.3%) cases the diagnosis was established following acrylate and parraffin embedding with additional immunohistochemical stains.

Two (6.3%) patients had two biopsies. One had a repeat biopsy at the same level to obtain an additional specimen to specify the type of lymphoma. The other patient underwent a second biopsy procedure in another vertebra to exclude multifocal osteomyelitis.

Complications

There were 2 complications (5.9%) in 34 biopsies. Both patients developed a hematoma ; one patient did require surgical revision. There were no neurological or respiratory complications and infections attributable to the trocar biopsy. The majority of patients experienced only mild discomfort during the procedure or afterwards, and patients rarely required narcotic analgesics after biopsy.

DISCUSSION

In this study we demonstrate that fluoroscopy-guided transpedicular biopsy in the thoracic, lumbar and sacral spine using a Jamshidi trocar with an internal diameter of 3.1 mm delivered an excellent sample for adequate histological evaluation in 91.2% of all biopsies. A specific diagnosis was possible in 94.1% of 34 examinations and in 93.8% of 32 patients with only two minor complications. In 72.7% (3) of the patients with biopsy procedures including imprint cytologies and frozen sections the final diagnosis was given within 20 minutes.

Table I. — Preoperative and postoperative data on 32 patients with 34 percutaneous fluoroscopy-guided transpedicular biopsy procedures.

Patient	Age	Sex	No. of Biopsies	No. of Specimens	Level	Biopsy Quality	Histological diagnosis	Anesthesia	Complications	Comment
1	68	M	1	2	L 1	Good	Osteomyelitis	GA		
2	47	F	1	1	T 3	Poor	Inadequate	GA	Hematoma	On clinical follow-up
3	21	F	1	2	L 4	Excellent	Normal or free of tumor	GA		
4	42	F	1	2	L 3	Excellent	Osteomyeltis	GA		
5	63	M	1	2	T 9	Excellent	Plasmocytoma	GA		
6	71	M	1	1	T 11	Good	Plasmocytoma	GA		
7	67	F	1	1	S 1	Excellent	Normal or free of tumor	GA		
8	62	M	1	4	S 1	Excellent	Osteomyelitis	GA		
9	60	M	1	2	L 3	Excellent	Hemangioma	GA		
10	73	M	1	1	T 12	Excellent	Osteoporosis with fracture	GA		
11	53	F	2	1	2 x L 1	Excellent	Lymphoma	GA		Two biopsies to specify type of lymphoma
12	59	F	1	2	L 2	Excellent	Metastatic breast cancer	GA		
13	54	M	1	1	L 3	Excellent	Possible pathologic	GA		On clinical follow-up because of suspected lymphoma
14	76	F	1	2	L 1	Excellent	Osteoporosis	GA		
15	78	M	1	1	T 12	Excellent	Osteomalacia	LA		
16	72	M	2	1	L 4 + 5	Excellent	Normal or free of tumor	GA		Two biopsies to exclude multiple level involvement of osteomyelitis
17	68	M	1	1	T 11	Excellent	Metastatic adenocarcinoma	GA	Hematoma	Surgical revision of hematoma
18	29	M	1	2	T 5	Excellent	Normal or free of tumor	LA		
19	55	F	1	1	L 4	Excellent	Osteomyelitis	LA		
20	14	M	1	1	L 3	Excellent	Osteomyelitis	GA		
21	63	M	1	1	L 3	Excellent	Metastatic osteosarcoma	LA		
22	36	M	1	1	L 1	Excellent	Normal or free of tumor	GA		
23	41	M	1	1	T 11	Excellent	Metastatic liposarcoma	GA		
24	78	M	1	3	L 1	Excellent	Lymphoma	GA		
25	91	F	1	1	T 9	Excellent	Normal or free of tumor	LA		
26	62	F	1	1	L 3	Excellent	Osteomyelitis	LA		
27	54	M	1	2	L 4	Excellent	Osteomyelitis	LA		
28	56	F	1	2	T 7	Excellent	Osteoporosis	GA		
29	63	M	1	1	T 10	Excellent	Metastatic prostate cancer	GA		
30	75	F	1	1	T 12	Excellent	Metastatic lung cancer	LA		
31	53	F	1	1	T 8	Excellent	Osteomyelitis	GA		
32	64	M	1	1	L 2	Excellent	Osteomyeltis	LA		

F=Female, M=Male, GA=General anesthesia, LA=Local anesthesia

The accuracy rate of a procedure must be balanced against its complication rate. In this study which, to our knowledge, reports the largest published series of fluoroscopy-guided percutaneous transpedicular biopsies, the accuracy rate of 93.8% compares favorably with that of biopsies obtained via other spinal approaches, which vary from 9.5% to 100% (1, 3, 5, 7, 9, 10, 13, 19, 21, 22, 23, 41, 42, 44, 46, 52, 53). Complications in spinal biopsies such as paraspinal hematoma, bleeding, transient paresis, temporary radiculopathy, paraplegia, meningitis, and death have been reported (3, 5, 12, 14, 15, 23, 24, 25, 28, 29, 34, 39, 40, 41 ,45, 50, 51, 52). Radicular pain from thoracic and lumbar vertebral body biopsies occurred in 7.7-10.5% of patients (7, 52). Previous studies of percutaneous biopsies of the thoracic spine using a paraspinal approach have shown that a pneumothorax developed in 4-11% of patients (7, 28, 29, 36). For the transpedicular route for a vertebral biopsy in the thoracolumbar spine, points of concern are the proximity to important structures as the spinal cord, the nerve roots or the pleura in the thoracic area (7, 27, 46, 53). Despite the fear of injury, routine use of the pedicle for open biopsy, stabilization and fusion is shown in the literature (20, 32, 35, 53, 58). In a larger series of percutaneous transpedicular screw insertions with a similar technique we have seen only two nerve root injuries in 408 pedicle screws (0.4%), although the screws had a larger

diameter of 6 mm (57). With a relatively large Jamshidi trocar with 3.1-mm internal diameter for all transpedicular biopsies in our study, the rate of complications (excluding mild to moderate discomfort) was 5.9% and is equal or even much better compared to that reported in other series of spinal biopsies, which have varied widely (0-26%) (22, 29, 37, 39, 40, 52). Two minor complications in 32 patients confirm that this almost painless procedure is not very traumatic.

We believe that the high diagnostic yield and low complication rate may be attributed to several factors : Preoperatively the patients and biopsy site were selected in consultation with radiologists, orthopedic surgeons and bone pathologists and with all xrays, scans and clinical records available.

During the biopsy procedure, highly precise fluoroscopic guidance was available to avoid vital structures and for exact placement of the trocar within the lesion. The patient must be comfortable, and the part to be sampled stable. All of the procedures were done with the most careful technique with strict attention to asepsis by orthopedic surgeons familiar with spinal anatomy. The adequacy of the tissue core itself depends on its size and the lack of architectural distortion. This is governed partly by the trephine trocar used and partly by the nature of the lesion itself. We used a second generation Jamshidi trocar (26) (fig. 1), which tapers distally towards a nonserrated cutting end. In our experience, the Jamshidi trocar is superior to other biopsy needles, in obtaining intact specimens of adequate size.

There are different opinions regarding the smallest diameter for obtaining a sufficient quantity of tissue for qualitative histologic evaluation. Some authors stated that a trephine of 2-mm diameter is sufficient to obtain good samples and leads to a satisfactory diagnostic yield (4, 22, 26, 49, 55) ; other studies reported that 3 mm is the smallest diameter for obtaining sufficient material (14, 15, 17, 18, 33, 56). Common problems of crush artifact and of obtaining inadequate amounts of material can be minimized by using the larger internal diameter trocars. In our experience specimens obtained with small instruments showed considerable histological distortion, especially with trephining. Small needle biopsy tends to produce a cytological smear rather than a histological block of tissue, and small trephines can cause considerable damage to the specimen. A small sample may be adequate for osteomyelitis, tuberculosis and myeloma, but when more detailed histology is required a larger specimen must be obtained. Disorders of bone metabolism, primary bone tumors, and sclerotic bone lesions, however, often demand larger tissue samples for histologic examination. The complications are thought to be more frequent with large trocars (29). Our series has shown that it is posssible to obtain these larger core specimens with safety.

The methods of tissue sampling, handling, and fixations vary in different institutions, and determination of adequacy is largely influenced by the needs of the pathologist. In our study the pathologist with a special interest in bone pathology was consulted concerning the quantity required and the correct and timely handling of the tissue once it was removed from the patient. In cases in which an adequate specimen is in doubt because of technical difficulties, rapid cytologic evaluation or frozen section diagnosis can be accomplished while the patient is still on the biopsy table. These techniques can help ensure that the procedure is not terminated before an adequate specimen is obtained. No pathological examination of a specimen was undertaken without concurrent review of the xrays of the lesion in question and of the clinical differential diagnosis. If the clinical impression and the biopsy results do not match, radiological and clinical follow-up is essential, and alternative diagnostic procedures should be considered. It should be remembered that if the patient has received previous radiotherapy, the histological diagnosis is difficult because of the structural changes produced by the irradiation. Because of all these complexities, close cooperation between the radiologist, orthopedic surgeon and the pathologist is needed.

Anatomic detail and biopsy technique

If the vertebral lesion is located in the upper or middle thoracic region, the biopsy technique must be slightly modified owing to the specific anatomic

requirements of this area. Anatomical studies have shown that the transverse outside diameter of the thoracic pedicle is often less than 5 mm (6, 8, 30, 31, 38, 48, 59). Moreover, the complex shape of the thoracic pedicle increases the risk of a disastrous compromise of the spinal canal (59). Therefore, we prefer a parapedicular route in the middle and upper thoracic area where the entry point is in the middle part of the transverse process. To avoid injury to the pleura the direction of the trocar in the upper thoracic spine must be more convergent than for a transpedicular route. It is important to select a more lateral entry point to the pedicle ensuring that any perforation of the pedicle occurs laterally, and is protected by the head of the rib, rather than medially into the spinal canal.

Advantages of fluoroscopy-guided transpedicular trocar biopsy

Often vertebral lesions are relatively small, with no extraosseus extension, and the location often is centrally or anteriorly in the vertebral body. Through a unilateral pedicular channel, more than 50% of a vertebral body is accessible for biopsy (53). In percutaneous transpedicular biopsy, there is minimal damage and contamination of normal tissue. The small wound heals rapidly and causes no interference with subsequent radiotherapy. The relatively narrow track of the Jamshidi trocar preserves the supporting tissue, thus preventing the local hemorrhage sometimes associated with open biopsy. The smaller specimen of bone obtained with this biopsy procedure is decalcified more rapidly, and sectioning can be expedited. In contrast, open biopsies of bone often yield large blocks, which may take longer to process.

Most patients can tolerate this procedure easily. With increasing experience most of the transpedicular biopsies can be done on patients with the use of local anesthesia, and therefore premedication is not essential. General anesthesia usually is required only in children or patients who are unable to remain still, and where acute local tenderness is present.

The radical resection of a primary malignant or locally aggressive spinal tumor requires *en bloc* removal of the lesion and of any biopsy track and hematoma caused by the biopsy. If the biopsy track must be excised when a lesion is to be removed, it is easier to accomplish after transpedicular biopsy than when one has to do *en bloc* resection of a larger open biopsy wound. In addition, the possibility of extensive spread of tumor cells along tissue planes is avoided, and there is less risk of spread of malignant cells or infectious organisms. This is almost impossible in a pathway outside of bone, such as in a paraspinal or a standard posterolateral approach : this contaminates every compartment along the track or may produce a contaminated paravertebral hematoma (7, 20, 29, 36, 46, 53). These potential complications can be avoided with the transpedicular approach because of its shorter needle tract with a small incisional wound and because of the containment of bleeding, infection, and spread of tumor within cortical bone (20, 53). In addition, certain lesions are difficult to access with the posterolateral approach, because the transverse process, iliac crest, or ribs obstruct the needle path. Small posterocentral lesions may also be difficult to reach with this approach (46). At the thoracic level the posterolateral approach can lead to pulmonary complications, especially pneumothorax or, occasionally, pneumonia. In our series, the transpedicular approach avoided pulmonary complications without increasing the rate of neurologic complications.

CONCLUSION

Transpedicular fluoroscopy-guided biopsy with a Jamshidi trocar with an internal diameter of 3.1 mm is a simple, safe and reliable method for the etiological diagnosis of vertebral lesions. The use of this technique, however, is dependent on accurate placement of the trocar and on close qualified interdisciplinary clinical cooperation.

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SAMENVATTING

G. MÖLLER, R. KOTHE, L. WIESNER, M. WERNER, W. RÜTHER, G. DELLING. Transpediculaire trocar-biopsie van de wervelzuil onder controle van de beeldversterker.

34 dot cilinders bij 32 patieten, bekomen met een Jamshedi rtocar, langs een transpediculaire toegangsweg ter hoogte van de thoracale, lumbale en sacrale wervelzuil, werden nagekeken met de bedoeling uit te maken hoe accuraat deze ranspediculaire techniek was in de diagnosisstelling van letsels van de wervelzuil.
De recente literatuur werd nageslagen.
Macroscopisch werden de cilinders gecontroleerd op lengte en breuken, microscopisch op de aanwezigheid van botmerg, trabeculae en artifacen.
Elk staal werd naar zijn histologische bruikbaarheid gegradeerd.
De diagnostische accuraatheid werd getoetst aan het verder clinisch verloop van de aandoening bij follow-up.
In 30 van de 32 patienten (93,8 %) leidde de biopsie tot de diagnosis, later geconfirmeerd of werd de aanwezigheid van pathologie door de biopsie uitgesloten.
De kwalireit van het bioptisch specimen was exellent in 31 van de 34 biopsies (91 %), twee stalen waren bevredigend (5,9 %) en één was slecht (2,9 %).
Er waren twee mineure verwikkelingen.
Transpediculaire wervelzuil biopsie onder fluoroscopische controle met de Jamshidi trocar (inwendige diameter 3,1 mm) is een veikige en efficiente techniek en geeft bot cilinders geschikt voor histologisch onderzoek.
De combinatie van kliniek, beeldvorming en anatomopathologie onderzoek geeft een hoge diagnostische accuraatheid.

RESUME

G. MÖLLER, R. KOTHE, L. WIESNER, M. WERNER, W. RÜTHER, G. DELLING. Biopsie rachidienne transpédiculaire au trocart sous contrôle radioscopique : résultats, évaluation et remarques techniques.

Les auteurs ont cherché à évaluer la technique et les résultats de la biopsie percutanée transpédiculaire au

moyen d'un trocart sous contrôle radioscopique, dans le diagnostic de lésion des corps vertébraux. Ils ont étudié les carottes osseuses obtenues lors de 34 biopsies transpédiculaires chez 32 patients, biopsies réalisées avec un trocart de Jamshidi au niveau du rachis thoracique, lombaire et sacré. Macroscopiquement, la longueur des échantillons a été notée, ainsi que leurs éventuelles fractures ; microscopiquement, les auteurs ont étudié les trabécules osseuses, la moelle et recherché d'éventuels artéfacts. Chaqu'un des échantillons a été classé en fonction de son intérêt pour l'étude histologique. L'exactitude du diagnostic a été contrôlée sur base de l'évolution clinique des patients au cours de leur suivi. Chez 30 patients sur 32 (93,8 %), la biopsie a permis de poser un diagnostic précis ou d'exclure une pathologie. Dans 31des 34 biopsies (91,2 %), la qualité de l'échantillon a été considérée comme «excellente», 2 échantillons (5,9 %) étaient «bons» et un seul (2,9) était «médiocre».

Les auteurs concluent que la biopsie transpédiculaire du rachis au moyen d'un trocart de Jamshidi avec un diamètre interne de 3,1 mm sous contrôle radioscopique est un examen sûr et efficace qui fournit des échantillons osseux valables pour l'examen histologique. La qualité des résultats est également basée sur l'étroite collaboration du clinicien, du radiologue et du pathologiste.