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TECHNICAL NOTE • HIP - INFECTION

Percutaneous technique for fluoroscopy-guided biopsy in the supra-acetabular region

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Abstract
The peri-acetabular area of the pelvis is a common site for a variety of lesions including neoplasia, histiocytosis or infective-like tuberculosis. A biopsy is necessary before planning treatment for these patients. Access to these lesions requires extensive dissection of soft tissues and is associated with blood loss and prolonged operative time. A percutaneous fluoroscopy-guided technique can be used to perform biopsy of lesions in the roof of the acetabulum through a minimally invasive approach. We have described a simple technique for biopsy of lesions in the acetabular roof using a percutaneous fluoroscopy-guided approach.

Keywords Bone biopsy · Supra-acetabular area · Percutaneous technique

Background

The supra-acetabular area of the pelvis is a common site for a variety of lesions including neoplasia, histiocytosis or infective-like tuberculosis. A biopsy is mandatory before planning treatment for such patients. Access to supra-acetabular lesions requires extensive dissection of soft tissues and is associated with blood loss and prolonged operative time. Percutaneous fixation of fractures of the anterior column using fluoroscopy to prevent these problems has been described [1]. This percutaneous technique can also be used to perform biopsy of lesions in the roof of the acetabulum through a minimally invasive approach. We have described a simple technique for biopsy of lesions in the acetabular roof using a fluoroscopy-guided percutaneous approach. The same percutaneous method can be used for injecting bone cement in cases of known metastatic lesions for reducing pain and improving bone stock.

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Technique

After anaesthesia and draping, the entry point for the needle will be the intersection of a line vertically upwards from the midpoint of the greater trochanter and a line drawn from the pubic symphysis upwards through the anterior inferior iliac spine. It will be mostly just proximal to the midpoint of a straight line joining midpoint of the iliac crest to the tip of the greater trochanter (Fig. 1). It is very important to stay at this point as per surface marking to prevent damage to neurovascular structures. We use a trocar cannula-based thick-needle biopsy system (Figs. 2 and 3).

After marking the entry point, a stab incision is made at that point. A thick needle is placed, under fluoroscopy, to penetrate the cortical bone at the exact location of the lesion (Fig. 4). The needle position is further confirmed using obturator and iliac oblique views combined with an inlet view for further safe corridor. The needle passes through the gluteus medius/minimus as well as the tensor muscle. Further, due to the posterior pelvic tilt, the needle may have to be directed to about 20°–30° off the horizontal. This needle is robust and can be hammered gently into the anterior column bone. The needle is withdrawn, and the serrated core biopsy instrument on a T-handle is introduced under C-arm guidance (Fig. 5). Gentle rotation of instrument may be needed to perforate the peripheral cortex of the lesion. Harvested tissue can be drawn from the harvester by pushing with the inner trocar. The safe percutaneous corridor for this technique can be

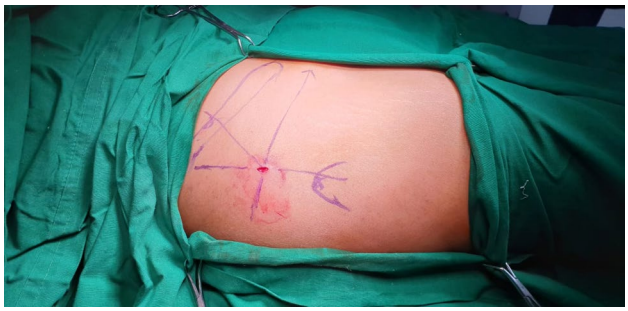

Fig. 1 Entry point marking for biopsy needle

Fig. 2 Biopsy instruments

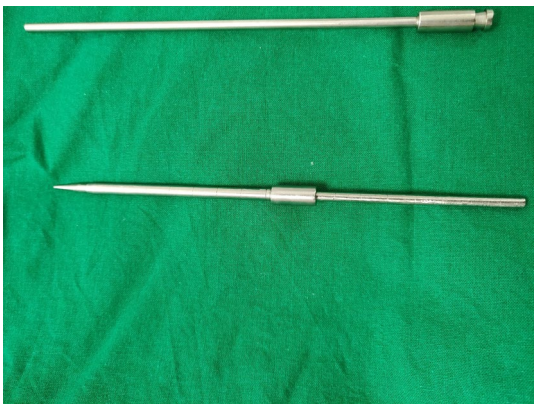

Fig. 3 Biopsy instruments

obtained with proper surface marking and accurate placement of needle using oblique views combined with inlet view.

Discussion

The acetabular roof can be a site for a variety of primary or secondary neoplastic or infectious lesions. An accurate histological diagnosis is necessary before commencing the definitive treatment. A percutaneous technique, performed by the treating orthopaedic oncologic surgeon, can be used to perform biopsy of lesions in the roof of the acetabulum through a minimally invasive approach [2].

Familiarity with the pelvic anatomy is important in the planning of a safe access route for biopsy of deep-seated lesions and helps avoid injury to major neurovascular structures [3]. The needle/trocar may pass through the gluteus medius/minimus as well as the tensor muscle. Further, due to the posterior pelvic tilt, the surgeon may have to direct his/her hand about 20°–30° off the horizontal. Fluoroscopy is essential to avoid penetration of the radiographic acetabular roof as well as the quadrilateral surface. In some cases of supra-acetabular metastatic lesions, it is possible to strengthen the acetabular roof with bone cement using vertebroplasty kits percutaneously which can be an extension of biopsy technique described [3–6]. Improper or inappropriate placement of needle may lead to complications like bleeding and neurovascular injuries. Hence, needle placement in the safe corridor using proper fluoroscopic views is a crucial step.

We describe a simple, inexpensive, and safe method of harvesting tissue from the acetabular roof for biopsy and allow early and rapid postoperative recovery. In a pilot study of 15 cases of various aetiologies, there has been a successful yield of material in 14 cases. As the safe corridor was followed, there were no major complications except two cases had minor haematoma which got spontaneously resolved.

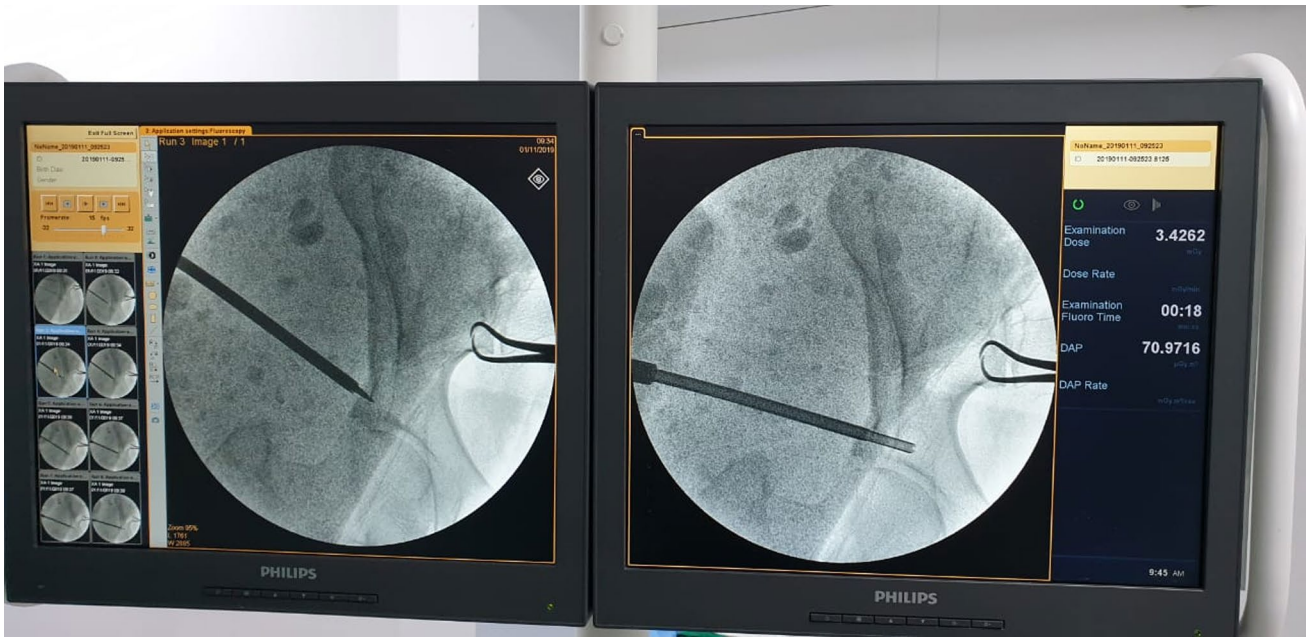

Fig. 4 C-arm guidance

Fig. 5 Biopsy needle and trocar

Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interest.

References

1. Bozzio AE, Wydra FB, Mitchell JJ et al (2014) Percutaneous fixation of anterior and posterior column acetabular fractures. Orthopedics 37:675–678
2. Vaishya R, Vijay V, Agarwal AK (2016) Novel technique for percutaneous biopsy of a peri-acetabular lesion. Ann R Coll Surg Engl 98:339–340
3. Gupta S, Nguyen HL, Morello FA Jr (2004) Various approaches for CT-guided percutaneous biopsy of deep pelvic lesions: anatomic and technical considerations. Radiographics 24(1):176–189
4. Li Zuoping, Butala Neha B, Etheridge Brandon S et al (2006) A biomechanical study of periacetabular defects and cement filling. Biomech Eng 129(2):129–136
5. Roitman Pablo D, Farfalli German L, Ayerza Miguel A et al (2017) Is needle biopsy clinically useful in preoperative grading of central chondrosarcoma of the pelvis and long bones? Clin Orthop Relat Res 475(93):808–814
6. Guzik G (2016) Treatment of metastatic lesions localized in the acetabulum. J Orthop Surg Res 11:54