Pain management of core needle biopsies

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Learning objectives

We propose a protocol for management of patients undergoing radiological percutaneous biopsy, to limit anxiety and pain.
Background

Pain management is a central element of our percutaneous biopsy procedures (1). It is of course essential for the patient, especially as cancer pathology leads to long and stressful therapeutic process, and patients often present a state of total physical and mental exhaustion. It is also essential to the serenity of the team in the workplace, and the profitability of biopsy samples as well. Pain management affects all caregivers, doctors of course, but also radiographers, who occupy a central role in this context.

In 2011, we conducted a telephone survey of 20 patients in order to evaluate and improve our management of pain (5 bone biopsies, 5 lung, 5 soft tissue, 5 liver):
- 35% of patients would have liked more information on the conduct of the examination before the procedure
- 25% of patients would have liked a better management of pain caused by the biopsy (say they have had trouble: 35% during the biopsy, 30% during the hospital surveillance, 55% after returning home).

This survey was for us a basis for improvement, pushing us forward on patient information first, then on the overall management of pain before, during and at the waning of the procedure.

We have thus established a wide standardized process described here in detail, whose interest has been shown in a new satisfaction survey in 2013.
Findings and procedure details

1 / Before

1.1 / Procedure planning by the radiologist

Before scheduling a biopsy, the radiologist naturally gives an opinion on the clinical relevance and the technical feasibility of the procedure. The experience of every practitioner in this type of activity allows the opportunity to anticipate:
- The predictable pain caused by the puncture, and to prescribe any premedication. Premedication protocols are standardized, and orders are sent by courier to the patient via the secretariat of radiology. The most used premedication protocol includes Hydroxyzin 50mg + Paracetamol 1g, 1 hour before the procedure.
- The hospital surveillance, based on possible complications and the risk of secondary pain (from 10 minutes surveillance in radiology department, to 24 hours surveillance with hospitalization)

1.2 / Procedure planning by the radiographer

24 to 48 hours before the procedure, the radiographer phones the patient to:
- Explain the biopsy set (sequence, duration, predictable pain, monitoring). This step is essential because a well explained act is better accepted, less scary, and finally less painful.
- Evaluate the chronic pain, prior to biopsy. In collaboration with the radiologist, any premedication can then be adapted (interdose morphine, etc...). Patient positioning during the biopsy can also be anticipated, based on technical constraints and spontaneous postural pain described by the patient.

2 / During

2.1 / Non-drug methods

The role of radiographers is essential here:
- To explain again the procedure to the patient, just before its implementation, also communicate with the patient during the procedure itself
- To contribute to optimal positioning of the patient on the biopsy table, in a less uncomfortable possible position, within the technical constraints of action (support arm, adapted cushions...)

- To eventually practice hypnoanalgesia, frequently used in mini-invasive procedures [2]. The basics of hypnoanalgesia have been taught to members of the team. The technique...
is conventionally divided into 4 phases to which the radiographer accompanying the patient: induction, dissociation, post-hypnotic suggestion, then exit of the hypnotic state. This is not provided to make the patient asleep, but to help focus his thoughts on something other than the action in progress, mostly through dialogue (conversational hypnosis).

A study in our department in 2012 on 30 patients showed that 80 % of them were receptive to hypnoanalgesia performed by trained personnel. This technique is safe and satisfactory for patients and caregivers.

2.2 / Drug methods
- Per-op analgesics

It is important for a radiologist to have simple and clear ideas about the use of analgesics during the procedure. Products used must be known, adapted to the patient and to the degree of emergency. Two documents are available at any time in the procedure room (Fig. 1 and 2): one containing the list of drugs that we most use and declining their contraindications, the other representing time and duration of action of major analgesics. The solutions most often used are paracetamol 1g IV and 2 mg bolus of morphine IV, with an interval of 5 minutes between two bolus. The "pain team" of the hospital is also quite available to support radiologists in these types of care, and is a valuable remedy for radiologists initially poorly trained in the use of analgesics.

- The MEOPA
Its use is very common in the operating room [3]. It is administered by facial mask airway (radiographer at the head of the patient, monitoring by simple verbal contact). The analgesic property occurs after 3 minutes of inhalation. Cumulative exposure in 24 hours should not exceeded 6 hours. Contraindications must be known and displayed.

- Local anesthesia (Fig. 3)
This is an essential point of the analgesic care around any procedure. The conventional use of lidocaine is now enriched by:
  . Alkalinization (bicarbonate + lidocaine): the addition of bicarbonate corrects the acidity of lidocaine, and the injection becomes significantly less painful [4]. The use of this method has become a routine (2ml of 4.2% sodium bicarbonate + 8ml of 2 % lidocaine ( with adrenaline or not)).
  . Epinephrine (adrenaline + xylocaine): it causes local vasoconstriction, which has several advantages: the maximum injected dose may be higher (500 mg versus 220 mg for lidocaine alone), the duration of action is longer (120-360 min versus 15-60 min). Contraindications must be known and displayed.
  . Ropivacaine is frequently used in addition to lidocaine because of its duration (120-360 min), most often in order to prevent early secondary pain within 3 hours after the procedure (indications based on the operator experience)

3 / After
3.1 / Adapted surveillance

Monitoring following the procedure must be anticipated and adapted to predictable and actual pain. It generally ranges from an immediate return home and a 24-hours surveillance in a conventional hospital unit. Specific instructions, duration and modality of monitoring are sent to caregivers and return home must be validated by the radiologist.

3.2 / Physical guidance

The patient receives advices from radiologists and radiographers: application of heat or cold, positions and movements to avoid ...

3.3 / Adapted analgesics

The rules are the same as during the procedure. Prescription drugs must be controlled by the radiologist, adapted to the patient, to the intensity and to the predictable duration of the pain. Orders are available from the secretariat and given to the patient before returning home. It usually includes a basic treatment of limited duration and an adjunct to the request. Paracetamol and antiinflammatory are frequently used.

3.4 / Information sheet

Before returning home, the radiographer shall give the patient an information sheet, specific to each type of procedure. It lists the banal post- biopsy symptoms, and the symptoms to get to a doctor. The " customer service" should be organized by the team, involving secretaries, radiographers and radiologists.

4 / Results

Following the telephone survey conducted in 2011, it's all this frame that was established. This process was evaluated by a new telephone satisfaction survey in 2013 on a similar sample of patients.

Of these patients, 80% received information prior to the biopsy (versus 40% in 2011). Among the many painkillers measures in place, 70% of patients were premedicated by hydroxizin and paracetamol (15% in 2011). 25% received hypnoanalgesia, 20% MEOPA. In 2013, 18% of patients experienced significant pain during the act, 16% in hospital-based surveillance, 35% after returning home (versus respectively 57%, 33% and 55% in 2011).
Fig. 1: Summary document available in biopsy room, about the use of useful drugs

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Fig. 2: Action time of the most used analgesics

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<table>
<thead>
<tr>
<th>Local Anesthetic</th>
<th>Onset (min)</th>
<th>Duration (min)</th>
<th>Max dose (mg/kg)</th>
<th>Max mg (70kg person)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ligocaine (1% or 2%) (Xylocaine)</td>
<td>2</td>
<td>15-60</td>
<td>3mg/kg</td>
<td>220mg (11mL 2%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(22mL 1%)</td>
</tr>
<tr>
<td>Ligocaine with adrenaline (1% or 2%)</td>
<td>2</td>
<td>120-360</td>
<td>7mg/kg</td>
<td>500mg (25mL 2%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(50mL 1%)</td>
</tr>
<tr>
<td>Bupivacaine (0.25%) (Marcain)</td>
<td>5</td>
<td>120-240</td>
<td>2.5mg/kg</td>
<td>175mg (50mL)</td>
</tr>
<tr>
<td>Bupivacaine with adrenaline</td>
<td>5</td>
<td>180-420</td>
<td>3mg/kg</td>
<td>225mg</td>
</tr>
<tr>
<td>Prilocaine (0.5% or 1%) (Citanest)</td>
<td>2</td>
<td>30-90</td>
<td>7mg/kg</td>
<td>500mg (&lt;70kg) (50mL 1%)</td>
</tr>
<tr>
<td>Ropivocaine (0.25%) (Naropin)</td>
<td>5</td>
<td>120-360</td>
<td>5mg/kg</td>
<td>200mg</td>
</tr>
</tbody>
</table>

**Fig. 3:** Dosage and duration of action of main local anesthetics

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Conclusion

The high activity of percutaneous biopsies in our department has led us to an overall reflection on the management of pain caused by our actions. The analgesic issue involves the entire staff, secretaries, radiographers and radiologists. This question must be central to every stage of care, benefit to the patient, staff, and the diagnostic yield of the samples taken. Above all, communication with the patient appears to us essential before, during and at the waning of the biopsy. All available means must then be mobilized, physical and medical. Handling of analgesic drugs is not a specialty for radiologist. Prescribed treatments must be known and adapted according to standardized protocols, if possible in accordance with the algology team.
References


