When and how to use Tru-Cut (Core-Cut) biopsies when evaluating solid tumours

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ISUOG-IOTA Advanced course in gynecological ultrasound
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When and how to use Tru-Cut (Core-Cut) biopsies when evaluating solid tumours

- Indications of biopsy
- Bioptic techniques
  - Ultrasound-guided Tru-Cut biopsy
    - Methodology
    - Diagnostic accuracy
    - Limitations and complications
- Conclusion
Ultrasound-guided tru-cut biopsy in the management of advanced abdomino-pelvic tumors

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Ultrasound-guided tru-cut biopsy of abdominal and pelvic tumors in gynecology

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Frequency of tumor bioptic methods
(2003 – 2008, Gynecologic oncology Centre)
Indications for biopsy

- Suspicious extragenital tumor: 25
- Suspicious recurrence: 27
- Suspicious duplicity: 31
- Other: 104

- Inoperable advanced tumor:

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Approach to get a tru-cut biopsy

Transvaginal 130 pts (62%)

Transabdominal 80 pts. (38%)

16G/25 cm

16G/15-20 cm

FAST GUN system (Sterylab, Italy)
Sites of tru-cut biopsy (n=210)

- Tumor: 79 patients
- Carcinomatosis: 68 patients
- Omental cake: 42 patients
- Lymph nodes: 10 patients
- Liver: 5 patients
- Mesenterial nodes: 5 patients
- Sacrouterine ligament: 1 patient
Limitation for application

- Thrombocytopenia
- Coagulative disorders
- Risky tumour location
- Intact tumour capsule with no sign of tumour spread

Potential complications – hematoma, infection, adjacent organ or vessel injury (perforation)
Practical approach

• Preoperative criteria for image guided biopsy:
  • The biopsy will be performed by a physician who is completely familiar with the indications, contraindications, limitations, typical findings and possible side effects of core needle biopsy, in particular, those relating to the specific organ being biopsied.
  • Control the presence of a tumour accessible for a biopsy and visible on ultrasound (CAVE- risky location for biopsy).
  • Avoid a risk of tumour spread by puncturing an encapsulated early ovarian cancer.
  • No bleeding diathesis with platelet count > $10 \times 10^9$/L and INR (international normalised ratio) < 1.4.
  • A decision made after multidisciplinary review that obtaining a definitive diagnosis by non-surgical means is required to plan further treatment.
Practical approach

- **Preparation:**
  - The ultrasound guided biopsy is usually performed immediately after routine gynecologic oncology scan.
  - No patient preparation is required.
  - Test the biopsy gun instrument and select penetration depth.
  - Prior to use, determine the appropriate gauge and length of the needle required for the specific biopsy to be performed (18 G/300 mm, -TVS, 18G/200mm-TAS).
  - Use appropriate aseptic technique.
  - Local anesthesia is used for transabdominal puncture.
  - The introduction of the needle tip into the tumour should be carried out under ultrasound control.
Practical approach

• Performance of procedure and aftercare:
• The collection of multiple needle cores (the number of cores and sampling different sites within a mass) may help to ensure the detection of any cancer tissue.
• Needle core biopsies are formalin fixed.
• The biopsy procedure typically lasts 10 minutes.
• Aftercare is usually not needed (outpatient procedure).
• Potential complications – hematoma, infection, adjacent organ or vessel injury (perforation)
• The technique is simple, variety of operators with different experiences are performing the procedure with the high accuracy.
Practical approach

• Pathological assessment:
  • Biopsy material is embedded in paraffin wax from which 3- to 4-µm sections were cut and stained routinely for hematoxylin and eosin (H&E).
  • In the majority of standard H&E staining is diagnostic, and this can be compared with historical material in women with prior malignancy.
  • The biopsy results is usually obtained within 48 hours of the procedure (rarely later if further special immunohistochemical stains may be required which identify specific tumour markers and other cellular proteins such as cytokeratins.
  • Dedicated pathologist to gynecologic oncology is a part of multidisciplinary team. To assess the biopsy a complete clinical information incl. indication for a biopsy must be provided.
Diagnostic accuracy of technique

- Biopsies in total: 221 (216 patients)
- Adequacy: 95% (206 biopsies)


PATIENT’S CHARACTERISTICS

Tru-cut experience 2005-2008
MARKER & ASCITES

Tru-cut experience 2005-2008

CA125 Ascites

p<0.01
INDICATIONS

Tru-cut experience 2005-2008
SITE OF BIOPSY

Tru-cut experience 2005-2008
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**p < 0.01**

**NS**
Diagnostic accuracy of technique

✓ Biopsies in total: 221 (216 patients)

✓ Adequacy: 95% (206 biopsies)

➢ Accuracy: 98% (2 disagreements/ 118 operated pts.)


Complication

- **Bleeding after tru-cut biopsy** (2 cases)
  1. Open laparotomy due to hemoperitoneum in patient with thrombocytopenia due to bone marrow tumorous infiltration
  2. Diagnostic laparoscopy due to bleeding from the tumor capsula (highly perfunded tumor)

- **Vasovagal syncope with bradycardia** (1 case)
Diagnostic accuracy of technique

✓ Biopsies in total: 221 (216 patients)

✓ Adequacy: 95% (206 biopsies)

✓ Accuracy: 98% (2 disagreements/118 operated pts.)

➢ Complication rate: 1% (3 pts.)


Video

• Transvaginal approach
  - biopsy from involved vesicouterine pouch

• Transabdominal approach
  - biopsy from advanced tumor
Conclusion

➢ The gold standard for diagnosis remains histology.

➢ If biopsy indicated, image guided tru-cut biopsy fulfils criteria for ideal bioptic technique:
  • Low invasiveness
  • Outpatient procedure
  • No need for general anesthesia
  • Relative contraindications
    (coagulopathy, anticoagulant therapy, high risk tumor location)
  • Low risk of complications
Conclusion

- US-guided vs CT-guided TRU-CUT biopsy:
  - A quicker procedure
  - Better tolerated by the patient
  - Without patient preparation and radiation exposure
  - A simple, cheap and readily available modality

- CT guidance reserved for more inaccessible tumour sites in abdomen
Conclusion

US-guided TRU-CUT biopsy:

- ADEQUACY: 95%
- ACCURACY: 98%
- SAFETY: 99%
Conclusion

- US-guided TRU-CUT biopsy allows to distinguish between primary ovarian and extraovarian tumors.
- Image guided biopsy results is usually available within 48 hours of the procedure and site-specific therapies can be instituted immediately.
Thank you

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Type of tumor

- Ovarian 71%
- Gastrointestinal 16%
- Retroperitoneal tumor 4%
- Urinary 0.5%
- Other gynecological 10.5%
- Other 1%

Diagnostic adequacy 97.7%, complication rate <1%