

Lesson of the week

Useless and dangerous—fine needle aspiration of hepatic colorectal metastases

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Fine needle aspiration cytology (FNAC) is an established tool for diagnosing liver tumours. It has recognised complications, however. Use of the procedure in abdominal tumours is fatal in 0.006 to 0.031% of cases.^{1,2} Most deaths occur with liver tumours and are due to haemorrhage. Another complication is that metastases can seed along biopsy needle tracts, although this has been reported to be rare, with an incidence of 0.003% to 0.07%, mostly from pancreatic tumours.^{1,2} More recently, much higher rates (0.4% to 5.1%) of needle tract metastases have been reported when FNAC is used in liver lesions, usually for primary liver tumours.³⁻⁷

Only 13 cases of needle tract colorectal metastases caused by FNAC in liver lesions are described in journals listed in Medline.⁷⁻¹³ Several authors have commented that the procedure should be avoided because of the risk of this complication. A further similar case is reported here, extending the contraindication of FNAC in hepatic tumours to include lesions for which no primary malignancy has been found. Therefore in Western populations, in which primary liver malignancy is rare, the diagnosis of apparently malignant liver lesions should centre on searching for the primary tumour, rather than on FNAC of the lesion.

Case report

A 78 year old man presenting with back pain was found on computed tomography of his abdomen to have a lesion in the right lobe of his liver. FNAC of the lesion was done without referral to a surgeon, and the result suggested metastatic adenocarcinoma. Subsequent investigation included colonoscopic biopsy of a sigmoid colon tumour, which was confirmed on histology to be the primary tumour. At laparotomy in June 2001 an anterior resection was done. The primary tumour was Duke's stage C, but it was completely excised on histology.

The liver lesion, 4 cm in diameter, was deemed unresectable at that time as it was too close to the vena cava. The patient was referred to an oncologist for adjuvant chemotherapy. After chemotherapy, repeat computed tomography showed that the lesion had reduced substantially in size and appeared separate from the cava and thus was amenable to surgical resection.

In December 2001 he had a right hepatectomy. The left lobe of the liver and the rest of the peritoneal cavity were free of disease at operation. The metastasis was close to but separate from the cava and was completely excised.

The patient developed cardiac failure postoperatively (having a history of ischaemic heart disease) and also a short period of decompensated hepatic failure.

He was transferred to the intensive care unit for a few days of inotropic and appropriate hepatic support, after which he made a slow but steady recovery and was discharged.

In June 2002 he noted a lump under the skin in the region of his previous FNAC puncture site and remote from his surgical scars. The subcutaneous nodule, 1.7 cm across, was excised under local anaesthetic. Histology showed metastatic adenocarcinoma. Despite radiotherapy to the tumour bed the lump recurred by October 2002. He had subsequent radical excision of the recurrent nodule, including surrounding abdominal wall, costal cartilages, and ribs. Despite this radical resection there were multiple tumour deposits in the resected specimen.

It was unlikely that the resection would be curative as the malignant cells extended to the radical resection margin. No further chemotherapy or radiotherapy could be given to control this recurrence. Repeated ultrasonography and computed tomography did not find recurrence of the disease, either in the liver or elsewhere. Therefore it seems likely that the patient would have remained free of disease after his hepatectomy but for the FNAC biopsy performed early in the management of his disease. The patient subsequently died.

Discussion

Of the seven previous reports of fine needle aspiration cytology of hepatic colorectal metastases causing needle tract metastases, six involve only one or two cases each and provide no indication of the rate at which the complication occurs.⁷⁻¹² The most recent report found that for FNAC of all hepatic malignancy there was a 3% risk of needle tract metastasis, a rate consistent with that found in other recently reported studies.¹³ For colorectal metastases specifically, the rate was 10% (5/51 cases); four of these five patients died as a direct result of this complication, despite radical excision of the deposits, as in this case.

The sensitivity of FNAC for detecting hepatic malignancy has been reported as 90-93%,^{6,7} similar to the diagnostic accuracy obtainable with radiological investigations of up to 91% sensitivity.¹⁴

Clearly it is desirable to avoid a situation where major surgery is done—only to discover that the suspected malignant tumour in the liver is benign. The rate at which this happens for suspected colorectal metastases has been reported to be only two of 159 cases, or 1.9%.¹⁵

In view of the rate of needle tract metastases (10%), the appreciable rate of false negative FNAC results (7-10%), and the low rate (<2%) of benign resection for suspected malignancy, the authors agree with the conclusions drawn in prior reports: that FNAC should

Biopsy of liver lesions causes needle tract metastases and should not be used for diagnosis

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be avoided when hepatic colorectal metastasis are suspected.

In view of the case presented, the authors strongly recommend that hepatic colorectal metastases be diagnosed and treated without FNAC at all. The investigations of an undiagnosed liver lesion should not include the procedure, but rather should be directed to detect the primary lesion. If these are all negative, then further investigation of the liver lesion by positron emission spectroscopy or laparoscopic biopsy may confirm the diagnosis without further disseminating disease.^{16 17} The abdominal wall is protected from direct contact with tumour cells by the ports used for laparoscopy, so laparoscopic biopsy is less likely to result in abdominal wall metastases than percutaneous biopsy. Positron emission spectroscopy may differentiate between benign and malignant lesions as malignant cells take up a radiolabelled marker more avidly than most normal tissues and so tend to "light up" on scanning.

If a hepatic lesion is discovered at the same time or after a primary colorectal malignancy is diagnosed, and if it appears to be malignant either on imaging or on appearances at laparotomy, then it should be treated as such, without biopsy. If the appearances are of a benign lesion, or are equivocal, then repeat evaluation with further imaging after an interval of three months or with positron emission spectroscopy¹⁷ may clarify the situation. If the disease progression is so rapid that it appeared resectable when first detected but becomes unresectable within three months, then the prognosis after resection would be very poor in any event,¹⁸ so little is lost by the delay.

Conclusion

The potential benefit of FNAC in suspected liver lesions is the confirmation of suspected metastases, and this may be attained effectively by other investigations with less than 2% of benign lesions misdiagnosed as metastases. This benefit is outweighed by the risks, including the serious and often fatal complication of needle tract metastasis and the risk of deriving false reassurance from a false negative FNAC result.

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- 1 Fornari F, Civardi G, Cavanna L, Di Stasi M, Rossi S, Sbolli G, et al. Complications of ultrasonically guided fine-needle abdominal biopsy. Results of a multicenter Italian study and review of the literature. The Cooperative Italian Study Group. *Scand J Gastroenterol* 1989;24:949-55.
- 2 Smith EH. Complications of percutaneous abdominal fine-needle biopsy. *Review. Radiology* 1991;178:253-8.
- 3 Takamori R, Wong LL, Dang C, Wong L. Needle-tract implantation from hepatocellular cancer: is needle biopsy of the liver always necessary? *Liver Transpl* 2000;6:67-72.
- 4 Chapoutot C, Perney P, Fabre D, Taourel P, Bruel JM, Larrey D, et al. Needle-tract seeding after ultrasound-guided puncture of hepatocellular carcinoma. A study of 150 patients. *Gastroenterol Clin Biol* 1999;23:552-6. (In French.)
- 5 Kim SH, Lim HK, Lee WJ, Cho JM, Jang HJ. Needle-tract implantation hepatocellular carcinoma: frequency and CT findings after biopsy with a 19.5-gauge automated biopsy gun. *Abdom Imaging* 2000;25:246-50.
- 6 Durand F, Regimbeau JM, Belghiti J, Sauvanet A, Vilgrain V, Terris B, et al. Assessment of the benefits and risks of percutaneous biopsy before surgical resection of hepatocellular carcinoma. *J Hepatol* 2001;35:254-8.
- 7 Herszenyi L, Farinati F, Cecchetto A, Marafin C, de Maria N, Cardin R, et al. Fine-needle biopsy in focal liver lesions: the usefulness of a screening programme and the role of cytology and microhistology. *Ital J Gastroenterol* 1995;27:473-8.
- 8 McGrath FP, Gibney RG, Rowley VA, Scudamore CH. Cutaneous seeding following fine needle biopsy of colonic liver metastases. *Clin Radiol* 1991;43:130-1.
- 9 Jourdan JL, Stubbs RS. Percutaneous biopsy of operable liver lesions: is it necessary or advisable? *N Z Med J* 1996;109:469-70.
- 10 Scheele J, Altendorf-Hofmann A. Tumour implantation from needle biopsy of hepatic metastases. *Hepatogastroenterology* 1990;37:335-7.
- 11 Goletti O, Chiarugi M, Bucciati P, Macchiarini P. Subcutaneous implantation of liver metastasis after fine needle biopsy. *Eur J Surg Oncol* 1992;18:636-7.
- 12 Vergara V, Garripoli A, Marucci MM, Bonino F, Capussotti L. Colon cancer seeding after percutaneous fine needle aspiration of liver metastasis. *J Hepatol* 1993;18:276-8.
- 13 Ohlsson B, Nilsson J, Stenram U, Akerman M, Tranberg KG. Percutaneous fine-needle aspiration cytology in the diagnosis and management of liver tumours. *Br J Surg* 2002;89:757-62.
- 14 Kinkel K, Lu Y, Both M, Warren RS, Thoemi RF. Detection of hepatic metastases from cancers of the gastrointestinal tract by using noninvasive imaging methods (US, CT, MR imaging, PET): a meta-analysis. *Radiology* 2002;224:748-56.
- 15 Clayton RAE, Clarke DL, Currie EJ, Madhavan KK, Parks RW, Garden OJ. Incidence of benign pathology in patients undergoing hepatic resection for suspected malignancy. *The Surgeon* 2003;1:32-8.
- 16 Luketich JD, Schauer P, Urso K, Townsend DW, Belani CP, Cidid Meltzer C, et al. Minimally invasive surgical biopsy confirms PET findings in esophageal cancer. *Surg Endosc* 1997;11:1213-5.
- 17 Strasberg SM, Dehdashti F, Siegel BA, Drebbin JA, Linehan D. Survival of patients evaluated by FDG-PET before hepatic resection for metastatic colorectal carcinoma: a prospective database study. *Ann Surg* 2001;233:293-9.
- 18 Fong Y, Cohen AM, Fortner JG, Enker WE, Turnbull AD, Coit DG, et al. Liver resection for colorectal metastases. *J Clin Oncol* 1997;15:938-46.

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