

Fine Needle Aspiration Causes Iatrogenic Spread of Malignancy

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Fine Needle Aspiration (FNA) is a widely used modality to differentiate malignant from benign tumours. The safety of FNA has been well established, though there are reports of needle tract seeding. We hypothesize that needle tract seeding is grossly under-reported, as most of the tract is usually excised, tumour cells do not have a favorable environment to grow, or the patient dies before a clinically detectable growth occurs in the needle tract. Though needle tract seeding may not be significant, the risk of distant metastasis should be alarming as the seeded cells can easily enter the systemic circulation through ruptured microvessels, lymphatics or coelomic cavities. Distant metastasis is a feature of malignancy and FNA may be a contributing factor that has been previously ignored. It remains difficult to prove that FNA can independently increase the risk of metastasis.

Introduction

Fine needle aspiration (FNA) is a percutaneous procedure that uses a fine gauge needle (22 or 25 gauge) and a syringe to sample fluid from or remove clusters of cells from a solid mass (Figure 1). With FNA, the cellular material taken from the tumor is usually sent to the pathology laboratory for analysis. FNA is routinely done for cytology or biopsy of tissues when a malignant growth is suspected. Though it is considered safe and widely accepted, there are reports of needle tract seeding of malignant tissue after FNA. Although the reported prevalence of needle tract seeding is very low, the potential remains for complications that are much more serious. These complications may even be happening at a very high frequency following FNA, but the primary tumour has ostensibly been blamed.

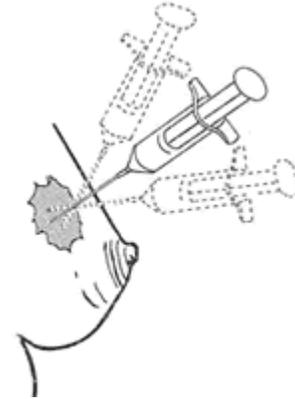


Figure 1: Fine needle aspiration (FNA). A small needle is inserted into the mass. Negative pressure is created in the syringe, allowing for cellular material to be drawn into the syringe for cytological analysis. Nearly any lump that can be palpated can be biopsied by FNA, which can be considered a less invasive procedure than surgical biopsy.

Needle tract seeding

Needle tract seeding after FNA has been reported for various tumours such as lung cancer (1, 2), breast cancer (3), papillary thyroid carcinoma (4) and other head-and-neck malignancies (5). Recently, the incidence of needle tract seeding after FNA of primary liver tumours has been reported as high as 0.4% to 5.1% (6). It increases further to 10% in colorectal malignancies (6). FNA can also cause transpleural spread of lung cancer (7), while intra-abdominal tumors like hepatocellular carcinoma (8) and carcinoid tumor (9) have been reported to spread through the peritoneal cavity. Even esophageal ultrasound-guided FNA of pancreatic adenocarcinomas (10) failed to prevent tract seeding. Factual tumour seeding may be much more frequent than the quoted

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incidence because the figures do not necessarily represent seeded cells, but rather, the well-formed tumour masses detected in the needle tract after FNA. Most of the tumour cells seeded in the needle tract are excised while removing the tumor. Moreover, even if a few cells are left in the tract, they may not be in an environment favourable for their growth. Though a few cells may overcome all these hurdles and start dividing, a tumour can be clinically detected only when the person survives for more than 3 years and has consistent follow-up (11). In spite of the barriers, up to 10% of tumour recurrence in the tract is reported. In patients who received percutaneous ethanol injection for hepatocellular carcinoma, needle tract seeding (12), as well as pleural seeding (13) has been reported. In this procedure, the incidence reported is 1.1 % (13), though there are no malignant cells in the bore of the needle and ethanol is supposed to kill most of the cells. This suggests that tumour seeding in the needle tract is much more common than previously believed. Although needle track seeding may not be of much importance in local growth, since seeded tumour cells are either excised during surgery or are treated with radiotherapy, there is an increased risk of distant metastasis that may fall outside the area of treatment.

Hypothesis

For various reasons, tumour cells in the needle tract may not manage to grow into a local tumour, but a cell that is seeded in the needle tract may gain access to the systemic circulation through ruptured microvessels or lymphatics in the vicinity causing iatrogenic metastasis.

Iatrogenic metastasis

As stated above, tumour seeding in the needle tract after FNA is almost a certainty; there are significant opportunities for the tumour cell to come in contact with ruptured microvessels and lymphatics, eventually gaining access to the systemic circulation. These cells may then localize in organs such as the liver or the lung, which have favourable environments to promote the development of the seeded cells into a

tumour. There have hitherto not been any attempts to differentiate metastasis initiated by FNA from the naturally occurring spread of malignancy.

Conclusions

The risk of causing iatrogenic metastasis by FNA needs to be readdressed. A retrospective comparison of the proportion of patients with distant metastasis among those who have undergone FNA and those who have not needs to be evaluated. This may be a helpful first step in analyzing whether FNA itself is an independent risk factor for distant spread.

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