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The Effects of Vacuum, Needle Gauge, and Ease of Use on Biopsy Yield During Aspiration of Subcutaneous Fat Using Conventional and Reciprocating Syringes.

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BACKGROUND: Fine needle aspiration biopsy of subcutaneous fat is an important, relatively noninvasive tool for the timely diagnosis of amyloidosis and certain neoplastic diseases. Such diagnoses may be missed or delayed because patients are unwilling or reluctant to undergo rectal, lip, or other biopsies.

PURPOSE: To determine the effects of vacuum, needle gauge, and ease of use during office-based fine needle aspiration of subcutaneous fat, using a conventional syringe and a prototypal one-handed reciprocating syringe.

METHODS: Fine needle biopsies were performed using 22, 19.5, and 17-gauge needles with: 1) no vacuum, 2) vacuum using a conventional syringe fitted with a syringe handle, and 3) vacuum using a prototypal reciprocating syringe. Clearing of the biopsy specimen from the needle was accomplished with backpressure from the respective syringe, and the specimen yield was determined using an electronic balance. Ability to determine vacuum during the procedure was ascertained as present or not present. Difficulty of disengaging the specimen from the needle was rated on a scale from 0 (no difficulty) to 10 (extreme difficulty). Overall ease of use was rated from 0 (extreme difficulty) to 10 (no difficulty). **RESULTS:** Needle gauge had significant effect on specimen mass: for the 22, 19.5, and 17-gauge needles, specimen masses, respectively, were 2.8 ± 0.7 , 8.9 ± 2.1 , and 23.7 ± 5.0 mg ($n=10$, $p<0.001$). Application of vacuum increased biopsy masses by 155%, 75%, and 77%, respectively, for the 22, 19.5, and 17-gauge needles ($n = 10$, $p<0.001$). The increase in biopsy yield was identical for the conventional syringe with syringe handle and for the reciprocating syringe. However, the ability to determine the presence of vacuum during the procedure, the ability to disengage sample from the needle, and overall ease of use were all superior with the reciprocating syringe ($p<0.001$).

CONCLUSIONS: Compared to a conventional syringe with syringe handle, the prototypal reciprocating syringe demonstrated superior ability to sense vacuum and to disengage the biopsy sample from the needle, as well as better overall ease of use during office-based fine needle biopsy of subcutaneous fat. The use of smaller-gauge biopsy needles with the application of vacuum, both of which are facilitated by the reciprocating syringe, is likely to increase patient compliance with recommended biopsies, improve sample yield, and help to provide more timely and accurate diagnosis of amyloidosis and certain neoplastic diseases.