



Ultrasound Gel Causes Fine Needle Aspiration Artifact

Ultrasound Gel Causes Fine Needle Aspiration Artifact? A Clear Choice

Mark C. Royer, Darrell D. Davidson, Rosen K. Dimitrov, Connie Y. Kuo, Mimi S. Kokoska

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Summary and Methods

The authors describe an artifact noted on ultrasound-guided FNA specimens and the artifact was proven to be associated with certain types of ultrasound gel media. In this study, a fresh human cadaver was obtained and FNA specimens were taken from the thyroid and parotid glands using ultrasound guidance and a 25 gauge needle attached to a 10cc syringe. Sterile couplant gel was used during each sample. The three couplants used were: Aquasonic® 100, Ultra/Phonic™ Conductivity Gel, and Surgilube®. Material Safety Data Sheets were also obtained on all three gels to assess ingredients. The cadaver was prepared with betadine and a gel filled cover was placed over the ultrasound probe. Eighteen FNA passes were taken in total; three per gel in each gland, using a new needle and syringe for each pass. Approximately 5ml of gel on the skin was used per pass. A similar amount of time and motion for cellular retrieval was utilized. The contents of the needle were expelled onto a slide and then smeared with another slide. Control slides were also made of each type of media to assure that this was the source of the artifact. These slides were then Diff-Quik™ or Papanicolaou stained and blindly read by two separate cytopathologists.

Discussion and Results

The cytopathologists were asked to blindly assess the slides for quality and presence of any artifact. Aquasonic 100 and Ultra/Phonic Conductivity gel exhibited poorer interpretive quality with an increase in the presence of gel artifact. Ultra/Phonic gel caused a coarser background staining than Aquasonic 100, however the differentiation from thyroid colloid was difficult in both of these gels. These artifacts added difficulty in identifying cells in the densely mottled background which in turn made specimen adequacy more challenging to determine. The control slides confirmed gel was the source of the artifact and coincided with a stronger presence of the artifact found in Ultra/Phonic and Aquasonic gels. Surgilube did not exhibit signs of this artifact. In review of the Material Safety Data Sheets, the main ingredient, propylene glycol, was present in all three gels, however a preservative, Phenoxyethanol, was only present in the Aquasonics 100 and Ultra/Phonic Conductivity gel. This preservative may be responsible for the artifact, although this was not conclusively determined by this study. The article recommended to avoid using suction while entering or exiting the gel interface as it may cause the couplant to be pulled into the needle before or after cells are obtained. Also, careful care should be taken when inserting the needle to not breach the probe cover as the gel within it could also contaminate the specimen and cause gel artifact on slides.

Conclusions

Since most ultrasound-guided procedures involve the needle passing through gel, contamination of samples with ultrasound gel can be observed on FNA specimens, however it is rarely reported in the literature. Gel has been implicated in the following:

- Source of cell swelling and lysis in breast FNA
- Cause of cellular interference in Pap smears

It is thought the preservative, Phenoxyethanol, within Aquasonic 100 and Ultra/Phonic Conductivity gel absorbs the stain similar to the nuclear material. The author concluded ultrasound gel may:

- Mask the nuclei in samples
- Make the interpretation for adequacy insufficient, especially in thyroid specimens

This artifact is seen as a potential cause for misinterpretation because of its similarity to colloid, necrosis or apoptosis and needs to be more widely recognized in cytopathology.

Author Commentary

"In the ideal setting, the medium for reducing the acoustic impedance should not contribute any artifact to the FNA specimen."