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Case Series

Sonographic Characteristics of Injectable Agarose Gel Filler: Two Case Reports and Practical Insights from Ultrasound-Guided Aesthetic Practice

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ABSTRACT

Ultrasound has become an essential adjunct in modern aesthetic practice, particularly for improving the safety and accuracy of injectable fillers. While the sonographic appearance of commonly used fillers is well described, limited data exist regarding agarose-based gel fillers. To describe the immediate in-vivo ultrasonic appearance of injectable agarose gel filler in the temple region Two patients presented with temporal hollowing were injected with 3.5% agarose gel filler, with needles in a bone-contacting approach (low supraperiosteal technique). Real-time ultrasonography was used throughout the procedure and comparisons made between baseline appearance & the appearance immediately after injection. Agarose gel filler demonstrated a well-defined, predominantly isoechoic appearance with minimal acoustic artifact. Yet, immediate integration with temporalis muscle varied between the two patients. Agarose-based fillers exhibit a distinct and reproducible sonographic pattern. ultrasonography is a useful and practical imaging modality for addressing complications of injectable, thus, knowledge of the defining features of each injectable material is invaluable, since it is the essential initial step in planning the treatment.

INTRODUCTION

In recent years, ultrasonography has transitioned from a niche research tool into a practical extension of the clinician's hand in aesthetic medicine. What was once limited to isolated case description has now become an integral part of safe filler practice, allowing visualization of soft tissue planes, vascular anatomy, and injected materials in real-time (1, 2).

Most injectable fillers currently in use – hyaluronic acid (HA), calcium hydroxyapatite (CaHA), polymethyl methacrylate (PMMA), poly-L-lactic acid (PLLA), polycaprolactone (PCL), silicone oil, and autologous fat – have well-described sonographic signatures (1-3). These patterns assist clinicians not only in guiding injections but also in diagnosing and managing complications.

Agarose-based gel fillers represent a less-commonly used category. Algeness® is composed primarily of agarose, a neutral polysaccharide that forms stable hydrocolloids when combined with water. Clinically, it is often perceived as painless on injection due to its isotonic and isosmotic properties. Despite its clinical use, published data describing its sonographic appearance in vivo remain scarce. From a practical standpoint, this lack of imaging data leaves clinicians reliant on tactile feedback alone – a limitation when injecting high-risk anatomical regions such as the temple. The present report aims to bridge this gap by describing the immediate sonographic features of agarose gel filler in two procedures temporal augmentation.

CASE REPORTS

Case 1

A 45-year-old male presented with bilateral temporal hollowing with no history of prior filler treatment in the region and requested aesthetic correction. After discussion of available filler options, agarose was selected, the patient was consented in writing for both performing the procedure and using the sonographic snapshots for purpose of publishing.

Before injection, ultrasonography using Philips Lumify™ probe (L12–4 MHz transducer) was used, a snapshot image of left temple was taken to document the baseline appearance, them injector proceeded to

visualize vessels with color Doppler, then in real-time fashion it was utilized for confirming needle position & its stable contact with bone throughout the procedure, in addition to filler material deposition.

Algeness® 3.5% Injection was used, with a 25-gauge needle; a bone-contacting volumization approach was adopted - low supraperiosteal technique (4). After a negative aspiration test a total of 0.7 ml was injected into each temporal area, through a single entry at 90 degree to the skin, the injector confirmed the feeling of needle contact with the bone, contact was visualized with ultrasonography as well. The product was infused slowly, and deposited as a single bolus on the bone, no external pressure was applied during the injection. Real-time ultrasonography was operating throughout the procedure, a snapshot image of left temple was taken immediately after withdrawing the needle before any massaging to the area, it demonstrated a well-defined, predominantly isoechoic filler deposit closely opposed to the temporal bone already partially-integrated within the temporalis muscle fibers (Figure 1). The patient experienced no immediate complications.

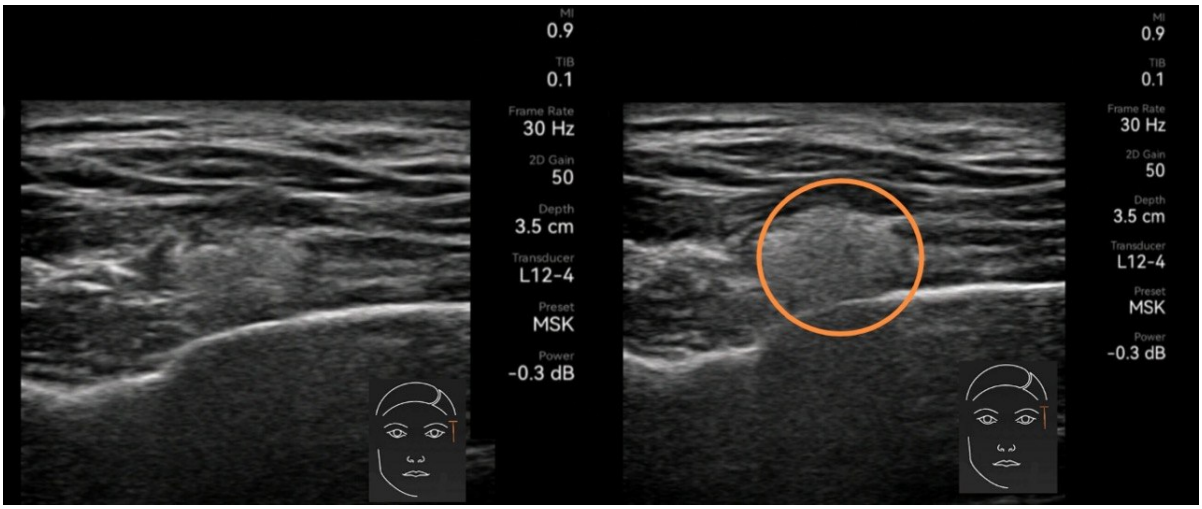

Figure 1. *Ultrasonic image of the Agarose filler over the bone, of the first patient.*

Case 2

A 40-year-old female presented with bilateral temporal hollowing with no history of prior filler treatment in the region and requested aesthetic correction. After discussion of available filler options, agarose was selected; the patient was consented in writing for both performing the procedure and using the sonographic snapshots for purpose of publishing

Using the same injecting technique described in Case 1, after negative aspiration test, 0.7 ml of Algeness® 3.5% was injected into each temporal area. real-time ultrasonography was kept throughout the procedure, a snapshot image of the right temple was taken immediately after withdrawing the needle before any massaging to the area. However, in contrast to the first case, integration with surrounding muscle fibers was not immediately apparent. The filler did appear as a discrete, isoechoic deposit overlying the temporal bone, yet with clearer demarcation from temporalis fibers compares to the previous case. The patient experienced no immediate complications (Figure 2).

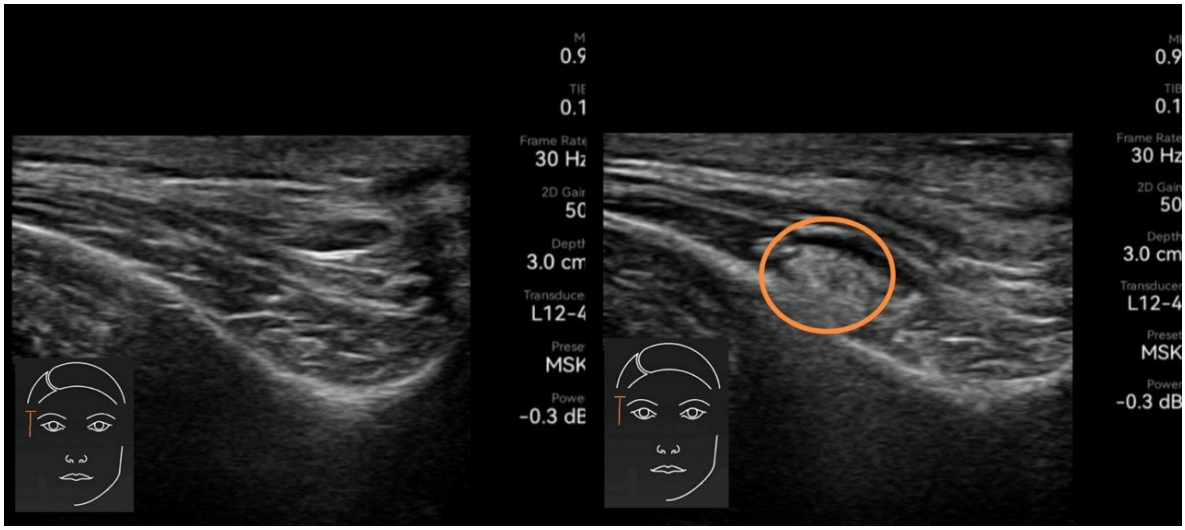

Figure 2. *Ultrasonic image of the Agarose filler over the bone, of the second patient.*

DISCUSSION

Sonographic Appearance of Injectable Fillers

Ultrasonography research established characteristic patterns for commonly used fillers. HA typically appears hypoechoic or anechoic with well-defined margins, while CaHA and PMMA demonstrate strong echogenicity with posterior acoustic shadowing due to their particulate nature (1, 2). PLLA often appears as small echogenic foci that may be difficult to detect unless superficial (1, 2).

In both cases presented, agarose gel filler demonstrated a well-defined, predominantly isoechoic appearance with minimal shadowing. According to the classification proposed by Urdiales-Gálvez et al., this pattern most closely corresponds to "coarse-grain snowfall" appearance (3). Importantly, the lack of significant artifact facilitated clear visualization of surrounding anatomy.

Ultrasonography provides reliable diagnostic signs of several sorts of complications: granuloma, fat necrosis, calcification, & vascular occlusion (5), in addition to product collection or migration, specifying the location of the problem and pointing with a good degree of confidence to the nature of the product injected. This objective imaging is of paramount importance in cases where patients could not reliably remember the product(s) they had been injected with previously.

In terms of intervention, HA products are responsive to hyaluronidase, by contrast, with all other products we don't have an enzyme able of dismantling the polymer .

However, there is a published protocol for "dissolving" Algeness®, using vitamin C (250-mg/ml in 0.1-0.2) ml aliquots (6).

The Importance of Timing in Ultrasound Interpretation

Timing plays a critical role in interpreting filler sonography, fillers have been studied either immediately after injection or later during complication assessment, but fewer reports addressed imaging appearance during the natural integration process. HA is among the few fillers evaluated longitudinally, reflecting its widespread use (7).

In the present cases, comparison of post-injection sonographic snapshots reveals different effects of the product bolus, in the first case it was already spreading within temporalis fibers, in the second case we saw a more cohesive bolus that maintained its integrity , rather displacing some of the surrounding tissues instead of

spreading into the temporalis , this is an important reminder that tissue response is not necessarily identical among individuals , even at time of injection, before any significant tissue remodeling occur. The difference observed between the two patterns is not easy to interpret, however it underscores that early sonographic appearance does not solely depend on filler composition or concentration, other factors might be involved including sex differences, tone & thickness of the temporalis, or even the injected side of the face .

Other limitations hindered our ability to provide further answers, such as the low number of individuals /treatments, treating only a single anatomical area, and absence of longitudinal follow up.

Agarose and Ultrasound: Lessons from Training Phantoms

Interestingly, much of what is known about agarose and ultrasonography comes indirectly from its widespread use in training phantoms. Agar-based substrates are designed to mimic human soft tissue acoustic properties with minimal image distortion (8, 9). These characteristics are consistent with the clear, artifact-free imaging observed in our cases and may explain why agarose gel fillers lend themselves well to ultrasonic visualization (Figure 3).

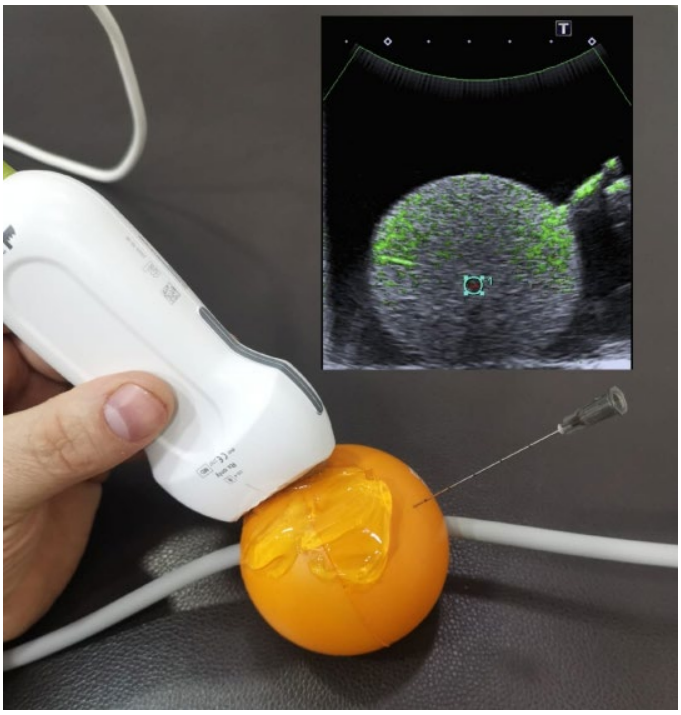

Figure 3. *Using ultrasonography phantom module, for demonstration in a student training session.*

Practical Clinical Implications

From a clinician's perspective, the ability to visualize agarose gel filler in real-time offers several advantages. Ultrasonographic guidance enhances procedural confidence, reduces the risk of vascular injury, and allows immediate confirmation of proper filler placement. Moreover, understanding the expected sonographic appearance aids in differentiating normal filler deposits from complications should concerns arise later.

CONCLUSION

Injectable agarose gel filler demonstrates a distinct and reproducible ultrasonic appearance characterized by well-defined, predominantly isoechoic deposits with minimal artifact. Real-time ultrasonic guidance provides valuable insight into filler placement and early tissue interaction, particularly in anatomically sensitive regions such as the temple. Further longitudinal studies are warranted to evaluate long-term behavior and integration of agarose-based fillers.

Abbreviations
HA: Hyaluronic acid
CaHA: Calcium hydroxyapatite
PMMA: Polymethyl methacrylate
PLLA: Poly-L-lactic acid
PCL: Polycaprolactone

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