EDITORIAL

Ultrasonographic Classification of Subcutaneous Edema Caused by Infusion via Peripheral Intravenous Catheters

For a long time, soft tissue edema had been diagnosed and evaluated using visualization, palpation, and circumference measurement, whatever the causes of limb edema, such as cellulitis, cardiogenic or nephrogenic peripheral edema, lymphedema, deep vein thrombosis, or phlebitis.

With the enhancement of ultrasound image resolution and the advent of stress-strain elastography, musculoskeletal ultrasound has been applied to evaluate and quantify the severity of limb edema [1–4]. The subcutaneous thickness is the most frequently utilized parameter, and other characteristics such as dermis layer quality, subcutaneous layer echogenicity, and subcutaneous fascial quality are also included in some research [5,6]. Many studies have reported on the quantitative thickness of subcutaneous tissue as a reliable parameter for following up disease progression or treatment effect [7,8], but few studies have mentioned the qualitative improvement of subcutaneous tissue. By far, there is still inadequate evidence to prove the diagnostic power of ultrasound when differentiating etiologies causing limb edema [9].

For ultrasound evaluation of catheter-related subcutaneous tissue edema, this article by Yabunaka et al is the first to be published. It is interesting to note that among the 53 patients graded as no subcutaneous edema by the clinical infiltration score, 66% and 4% demonstrated mild and severe subcutaneous edema under sonographic inspection, respectively. All 15 patients classified as sonographically normal were also categorized as clinically normal. Ultrasound seemed a more sensitive tool than physical examination to detect deeper and milder subcutaneous tissue swelling.

Nevertheless, among the 41 patients classified as mild subcutaneous edema under sonographic evaluation, 12% demonstrated clinically severe edematous change, meaning the blanchable erythematous edema spreading beyond 1 inch. This population might have more sensitive skin reactions instead of subcutaneous reaction that caused the discrepancy between clinical and ultrasound assessments. It is a pity that the research did not record patient’s pain score, local tenderness, response to topical antiallergic agents, and recovery time after catheter removal. If the ultrasound can differentiate skin allergy and subcutaneous edema from phlebitis, or can predict edema recovery time, ultrasound would have a significant role for assessing catheter-related swelling, and this might be a field for future studies.

References

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