Ultrasound Elastography to Evaluate Keloids

Rino Aya, MD
Satoko Yamawaki, MD
Department of Plastic and Reconstructive Surgery
Graduate School of Medicine
Kyoto University
Kyoto, Japan

Gan Muneuchi, MD, PhD
Department of Plastic and Reconstructive Surgery
Kagawa University
Kagawa, Japan

Motoko Naitoh, MD, PhD
Shigehiko Suzuki, MD, PhD
Department of Plastic and Reconstructive Surgery
Graduate School of Medicine
Kyoto University
Kyoto, Japan

Sir:

Ultrasound elastographic methods have provided the means for the objective and noninvasive evaluation of the stiffness of organs, such as the liver, breast, and thyroid. For example, liver ultrasound elastography provides information regarding the stage of fibrosis and can help physicians manage patients.¹

We herein report our experience using ultrasound elastography to evaluate keloids. The device used in this study was a HITACHI Vivion Avius ultrasound scanner with real-time strain elastography and the L74M linear (5–13 MHz) probe (Hitachi Medical Corporation, Tokyo, Japan). This device calculates the tissue deformation or strain induced by a stress that is applied with slight free hand compression. The extent of the strain of the tissue is related to its stiffness, that is, the value decreases as the tissue becomes harder. The strain elastography provides a qualitative measurement of stiffness that is expressed as the ratio to a control region, such as the normal dermis.

A 53-year-old man sustained an immature, elevated keloid with pain and itching on his chest (Fig. 1). The strain ratio defined as the normal dermis/keloid value was 21.0 (Fig. 1B). A 31-year-old woman had a mature flattened keloid after intralesional injection of steroids on her left shoulder and the strain ratio (normal dermis/keloid) was 0.76 (Fig. 2). These results suggest that the strain of the immature elevated keloid had a small value, and the strain ratio defined as the value of the normal dermis/keloid was increased compared to that of the mature flattened keloid.

Accurate scar assessment before and after interventional treatments demands a quantitative and noninvasive analysis of the scar properties, but at present, there is no reliable assessment tool for measuring the characteristics of cutaneous scars.² Although ultrasonography is a technique that can be conveniently used in daily practice and had demonstrated a good basic accuracy and reliability in scar management,² there are no reports that show the

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Fig. 1. A, A 53-year-old man sustained an immature elevated keloid on his chest that was associated with pain and itching. The white line indicates the location examined by the linear probe used for the ultrasound elastography. B, The ultrasound elastography image. The white arrow shows the separation between the normal skin and the keloid. The hyper-echoic area on the left is the normal skin, and the hypoechoic area on the right is the keloid. Each strain was measured in the range enclosed by a square in the normal dermis and in the range enclosed by a circle in the keloid. The extent of the strain of the tissue is related to its stiffness, and the value decreases as the tissue becomes harder. The strain ratio defined as the value of the normal dermis/keloid was 21.0.
stiffness of scars determined using ultrasound elastography.

Although we reported only 2 cases in this study, our data indicate that ultrasound elastography can be used to assess the stiffness of keloids and scars and, consequently, to monitor the effectiveness of conservative treatment of keloids objectively by comparing the stiffness values. This method warrants further development.

Bessonart et al examined pathological scars by B-scan ultrasound and demonstrated that the pathologic scars had significantly reduced densitometric values compared with the neighboring healthy skin. In our study, the immature elevated keloid was shown as a hypoechoic area, while the mature flattened keloid had a similar echo signal to normal skin in the B-scan. We can examine B-scans using the same device used for elastography, and a combination of these data may provide useful data for evaluating keloids and scars.

In conclusion, the evaluation of keloids using ultrasound elastography allows for a noninvasive examination to provide objective measurements of the stiffness of the lesions, and it seems to have the potential to be used as a tool to assess skin scars.

DISCLOSURE

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