



Discrimination of melanoma lesions severity by real-time elastography measurements

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INTRODUCTION

Relative elasticity or rigidity (stiffness) of the tissues can be assessed by real-time elastography (RTE) that RTE appearance proved to significantly correlate with strain ratio (SR) of lesion to dermis and hypodermis. We aimed to investigate the accuracy of real-time elastography measurements (SR of lesion to normal dermis and hypodermis) in discriminating melanoma lesions severity.

MATERIAL AND METHODS

- The same radiologist evaluated 42 cutaneous melanoma lesions in 39 adult subjects by real-time strain elastography.
- Semi-quantitative measurements expressed as SR of lesion to normal dermis and hypodermis (Fig. 1) were recorded.
- The classification of the lesions was made based on pathologic results regarding Breslow depth.
- Three different classifications of melanoma lesions based on Breslow depth were used in the analysis: ≤ 1 mm (including *in situ* lesions), between 1.01 mm and 4 mm, and > 4 mm.
- ROC (receiver operating characteristic) curve analysis was conducted to assess accuracy of SR of lesion to normal dermis and hypodermis into categorizing the melanoma lesions.
- AUC (area under the curve): The threshold was choose to maximize the J index, where $J = \max(\text{Se} + \text{Sp})$

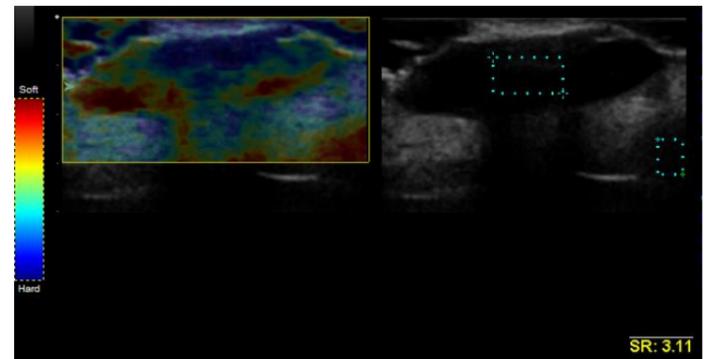


Fig. 1. Strain elastography with very high frequency transducer: stiff melanoma in a 72 years old male, SR tumor vs. hypoderma

RESULTS

SR of lesion to dermis (Fig. 2)

- Proved statistically significant at a significance level of 6% in discriminating the lesions with Breslow depth higher than 4 mm.
- AUC = 0.731 (95%CI [0.519-0.942])
- Se (Sensibility) = 42.9%
- Sp (Specificity) = 97.1%
- Threshold of SR lesion to dermis = 1.440

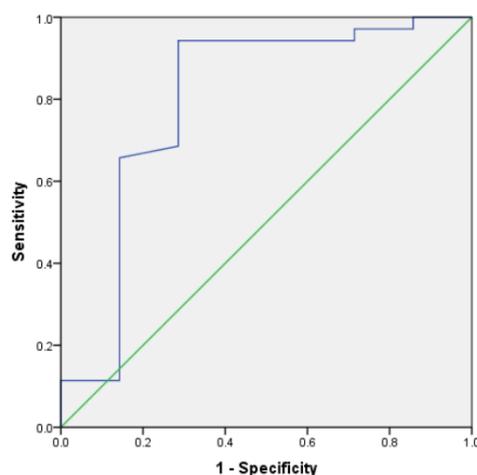


Fig. 2. ROC curve for SR of the lesions to dermis

SR of lesion to hypodermis (Fig. 3)

- Proved statistically significant ($p=0.0137$) in discriminating the lesions with Breslow depth higher than 1 mm.
- AUC = 0.798 (95%CI [0.569-0.999])
- Se = 94.3%
- Sp = 71.4%
- Threshold of SR lesion to hypodermis = 0.950

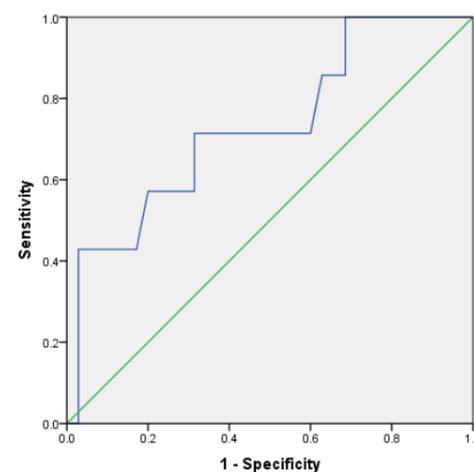


Fig. 3. ROC curve for SR of the melanoma lesions to hypodermis

CONCLUSION

A value of strain ratio of cutaneous melanoma lesion to hypodermis, measured by real-time elastography, higher than 0.950 indicates an intermediate or thick melanoma. However, the accuracy of this threshold in discriminating melanoma severity is moderate.

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