

“Metsovo Lung” with benign pleural calcifications:

A CXR image with complimentary information from Ultrasound Elastography

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SUMMARY

Metsovo lung was an epidemic lung disease resulting from domestic asbestos exposure in Metsovo area of northwestern Greece, that declined after white wash ceased to be used after 1985. This exposure to thin tremolite fibers caused an epidemic of malignant mesothelioma and benign pleural calcifications in almost 80% of those above 70 years of age. A case of Metsovo lung in an asymptomatic Albanian older woman that lived in an area outside Metsovo is described, along with thoracic ultrasound and elastographic findings that were compatible with a benign domestic exposure to asbestos.

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Key words:

- Metsovo lung
- Thoracic ultrasound
- Ultrasound elastography

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“Metsovo Lung” was an epidemic of lung disease resulting from domestic exposure to asbestos in Metsovo (a village in Northwest Greece). Most of the inhabitants had previously been exposed to a whitewash derived from local soils, containing tremolite asbestos. This substance caused an epidemic of malignant mesothelioma (MM) that reached an incidence of 300 times more than expected in populations not exposed to asbestos. It was accompanied by pleural calcifications (PCs) in almost 50% of the adult population, increasing to 80% in those above 70 years old (confirmed in a field study in Metsovo and 3 neighboring villages around Ioannina - the capital of Northwest Greece's Province)^{1,2}. Both conditions had declined significantly since whitewash ceased to be used after 1985. Transbronchial lung biopsies from Metsovitans with extensive PCs revealed long thin tremolite asbestos fibers, in spite of their minuscule size.

Elastography-based imaging techniques have received substantial attention in recent years, for a non-invasive assessment of tissue's mechanical properties. They take advantage of changed soft tissue elasticity in various pathologies to yield qualitative and quantitative information that can be

used for diagnostic purposes. UltraSound Elastography (USE) provides complementary information to conventional US by adding stiffness as an another measurable property to current US techniques. The assessment of tissue stiffness through palpation is based on the fact that mechanical properties of tissues are changing as a result of various diseases and situations. A higher tissue stiffness translates into a higher elasticity modulus, and as a result, during tissue palpation, tumors are felt as tissues harder than the surrounding normal areas.

Harder tissues deform under compression less than softer tissues. Their pre- and post- compression US images are similar and thus, better correlated. On the other hand, softer tissues undergo greater deformation under compression and their images differ, indicating a lower degree of correlation. The stiffness of investigated tissue can be assigned by different color-coded or gray-scales depending of US transducer. So, because of the nonlinear behavior of various tissues, the initial compression should be very gentle, in order not to reduce the difference in the effective stiffness.

A 77-years old female patient living in Koritsa village outside Metsovo area presented for evaluation with a working diagnosis of possible TBC. In CXR image (Figure 1) can be seen calcified pleural plaques, bilateral and relatively symmetrical, due to asbestos exposure. In US image (Figure 2) are observed two calcified pleural plaques and in compression USE (Figures 3, 4) calcified

pleural plaques are shown with acoustic echoes of benign etiology (light blue color).

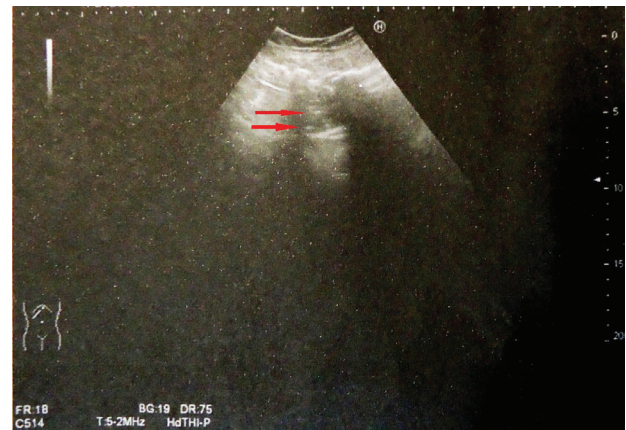


FIGURE 2.

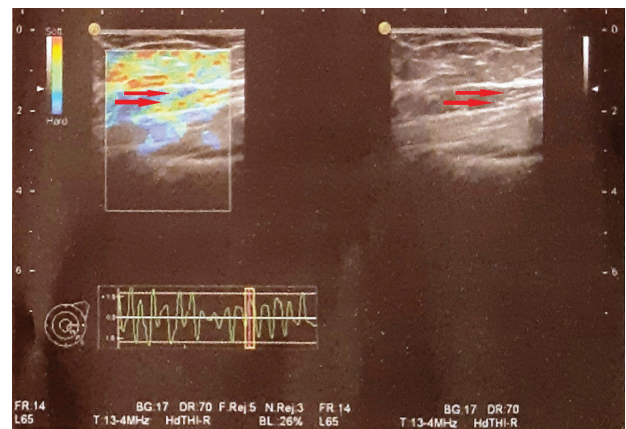


FIGURE 3.

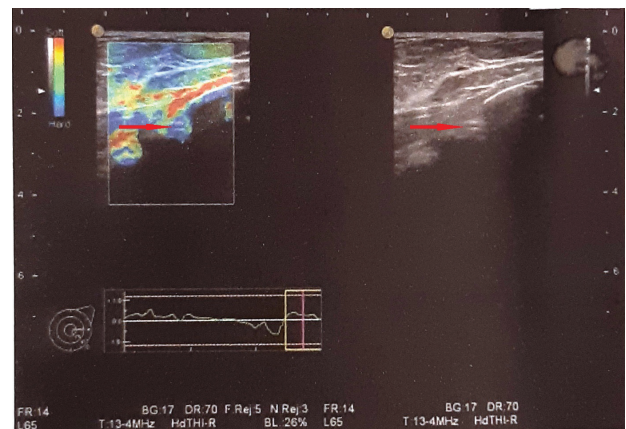


FIGURE 4.

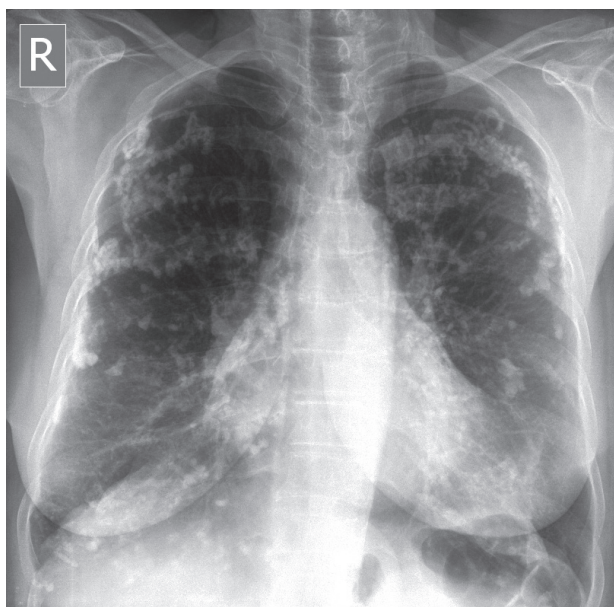


FIGURE 1.

According to our knowledge, no data exist of USE for thoracic imaging (USE is currently used to differentiate liver, thyroid, breast and prostate lesions). Interestingly, in

the recent ERS monograph Thoracic US 2018, no images of pleural plaques are provided, although it is among the most common (benign) finding³.

ΠΕΡΙΛΗΨΗ

«Πνεύμονας Μετσόβου» με καλοήθειες υπεζωκοτικές επασβεστώσεις: Ακτινογραφία θώρακα και συμπληρωματικές πληροφορίες από την Υπερηχογραφική Ελαστογραφία

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Ο «Πνεύμονας Μετσόβου» αποτέλεσε μια επιδημία πνευμονικής νόσου που οφείλεται στην εγχώρια έκθεση στον αμίαντο στην περιοχή του Μετσόβου. Οι περισσότεροι από τους κατοίκους είχαν εκτεθεί στο παρελθόν σε ασβέστη που προέρχεται από τοπικά εδάφη, που περιέχουν τρεμολίτη (αμίαντο). Αυτή η ουσία προκάλεσε επιδημία κακοήθους μεσοθηλιώματος του υπεζωκότα και έφτασε να είναι 300 φορές μεγαλύτερη από την αναμενόμενη, σε σχέση με πληθυσμούς που δεν εκτέθηκαν σε αμίαντο. Συνοδεύτηκε από υπεζωκοτικές ασβεστώσεις σε ποσοστό σχεδόν 50% του ενήλικου πληθυσμού αγγίζοντας το 80% σε ηλικίες άνω των 70 ετών. Οι διαβροχικές βιοψίες των πνευμόνων των ασθενών αποκάλυψαν μακριές λεπτές ίνες τρεμολίτη, παρά το μικροσκοπικό τους μέγεθος. Περιγράφεται περίπτωση ασυμπτωματικού ασθενούς με πνεύμονα του Μετσόβου. Παρουσιάζονται υπερηχοτομογραφικές εικόνες των επασβεστώσεων και περαιτέρω ανάλυση με ελαστογραφία, όπου διαπιστώθηκε η καλοήθης παθολογία των υπεζωκοτικών βλαβών.

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Λέξεις - Κλειδιά: Αμίαντος, Πνεύμονας Μετσόβου, Υπεζωκοτικές Επασβεστώσεις, Υπερηχογραφική Ελαστογραφία

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