Intrahepatic cholangiocarcinoma: diffusion-weighted MR imaging findings

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Purpose

The apparent diffusiom coefficients (ADC's) of focal liver lesions have been reported to be different regarding their mean values. Malignant lesions demonstrate lower ADC values than benign lesions.

Data regarding the diffusion-weighted MR imaging (DWI) features in mass-forming intrahepatic cholangiocarcinoma are lacking.

The aim of our study is to report the DW-MRI findings in mass-forming intrahepatic cholangiocarcinoma as well as to evaluate the usefulness of ADC values in helping the diagnosis.

Images for this section:

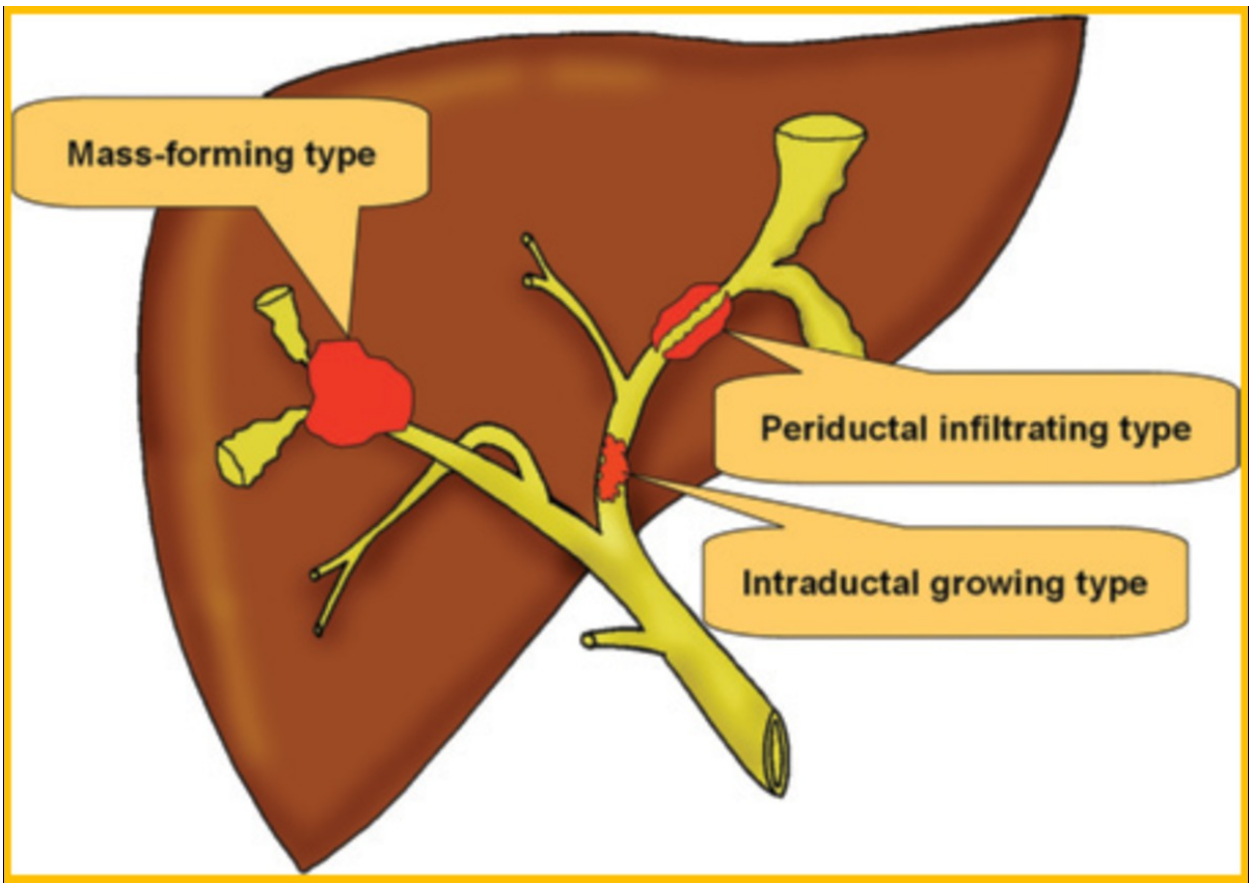

Fig. 5

Methods and Materials

Nineteen patients (10 men, mean age 63.5 years) were included in our retrospective study between August 2008 and August 2011.

Nineteen lesions of mass-forming intrahepatic cholangiocarninoma were diagnosed and confirmed by surgery and/or biopsy.

All patients underwent an MRI examination in a 3-T MR unit. Our standard protocol was applied which includes the sequences T1 in-out, T2 HASTE, T2FS, TIVIBE before and in arterial, venous and late phase after intravenous injection of Gadolinium.

The diffusion-weighted MR-sequences (DWI) were used during superficial breathing (b-values: 50, 300 and 600 s/mm^2)

Image analysis was made by two radiologists in consensus that took in consideration lesion characteristics (size, location), signal intensity (T2), contrast enhancement ($SI_{VIBE\ VENOUS\ PHASE}$- $SI_{VIBE\ PREGD}$)/ $SI_{VIBEPREGD}$, and ADC values.

Regarding the analysis of ADCs , a circular region of interest (ROI) was placed on the DW-image with b=600s/mm^2 encompassing the part of the lesion with most pronounced contrats enhancement seen on the T1VIBE.image. The same ROI was then transferred on the ADC map an the resulting $ADC_{mean,}$ ADC_{min} and ADC_{max} values were measured.

Statistical analysis was performed using ANOVA system as well as correlation analysis. A p-value was considered significant at <0.05.

Images for this section:

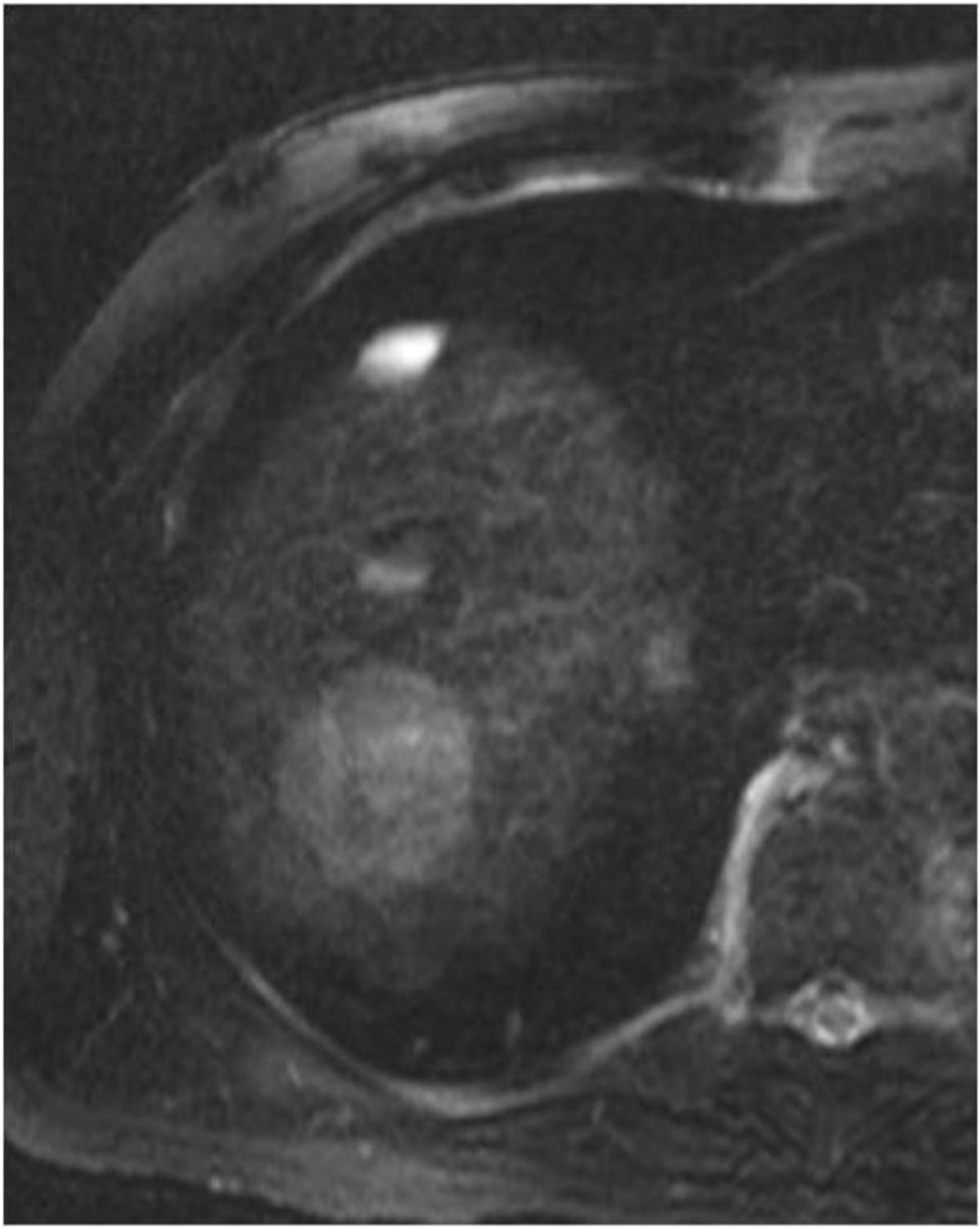

Fig. 2: T2FS weighted image demonstrates mass-forming intrahepatic lesion in the VII segment , slightly hyperintense

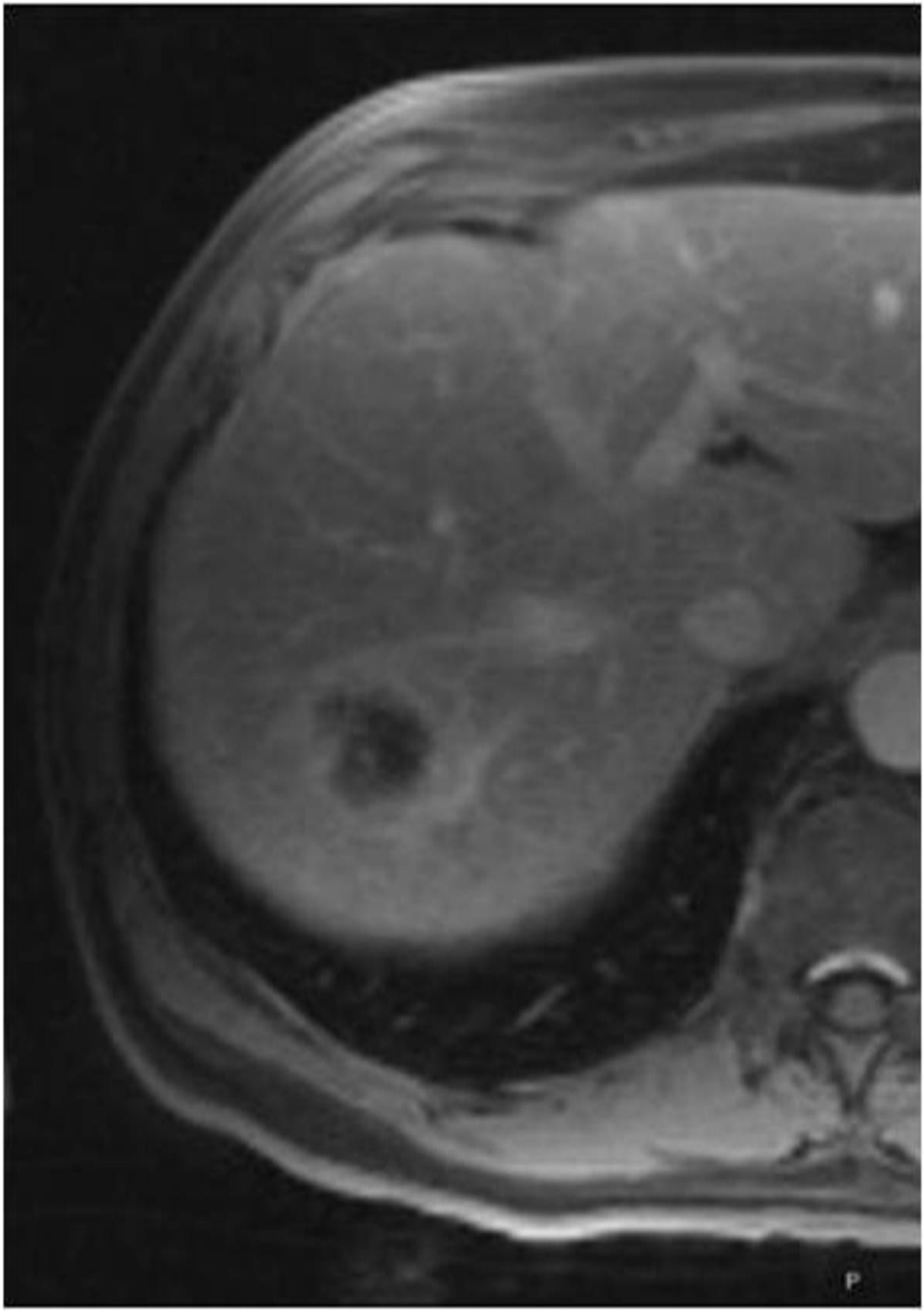

Fig. 1: T1VIBE aftre intravenous injection of Gd showing the characteristic centripetal enhancement of the tumor in venous phase.

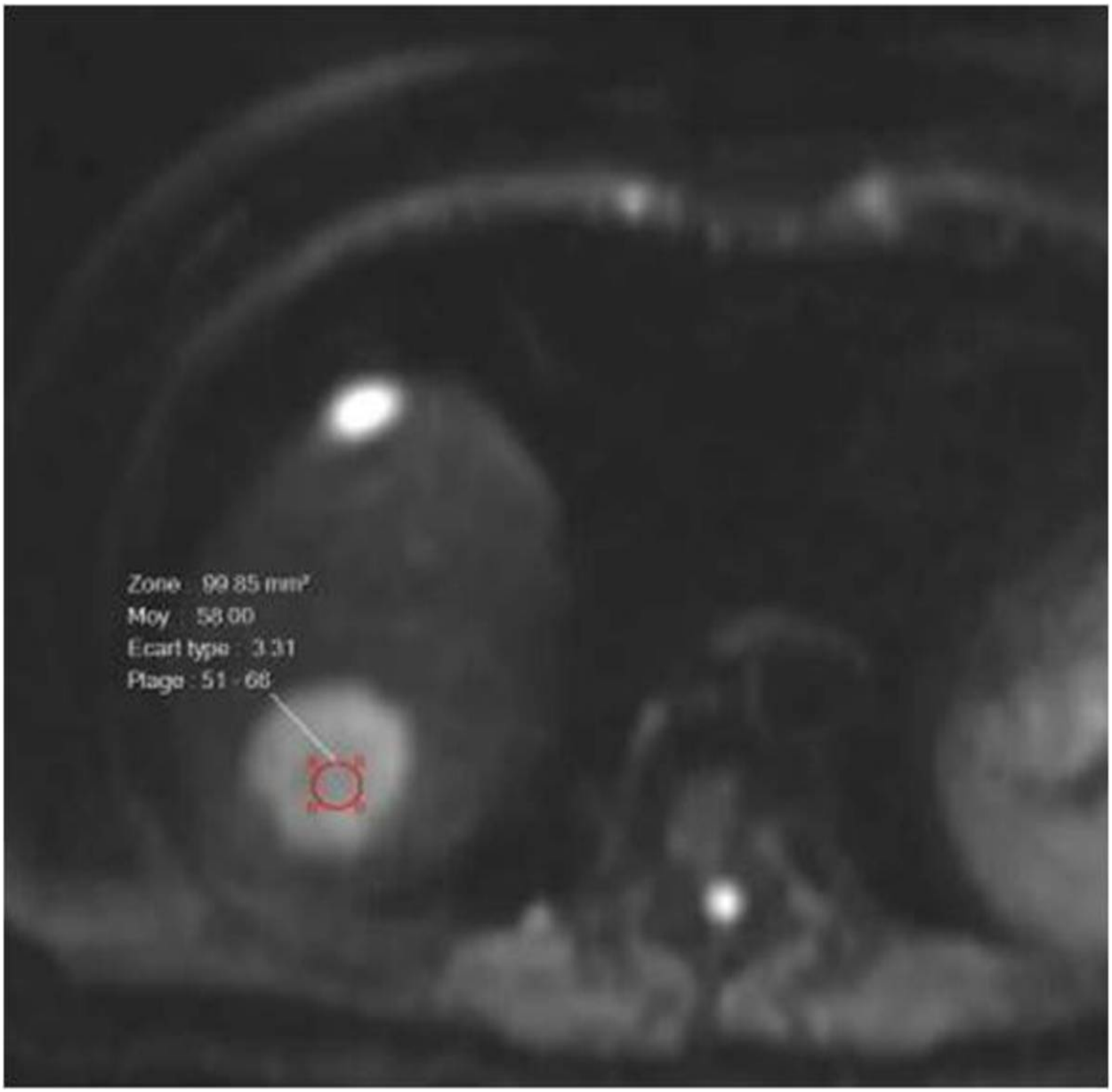

Fig. 3: DWI-SS-EPI image with b=600s/mm2.

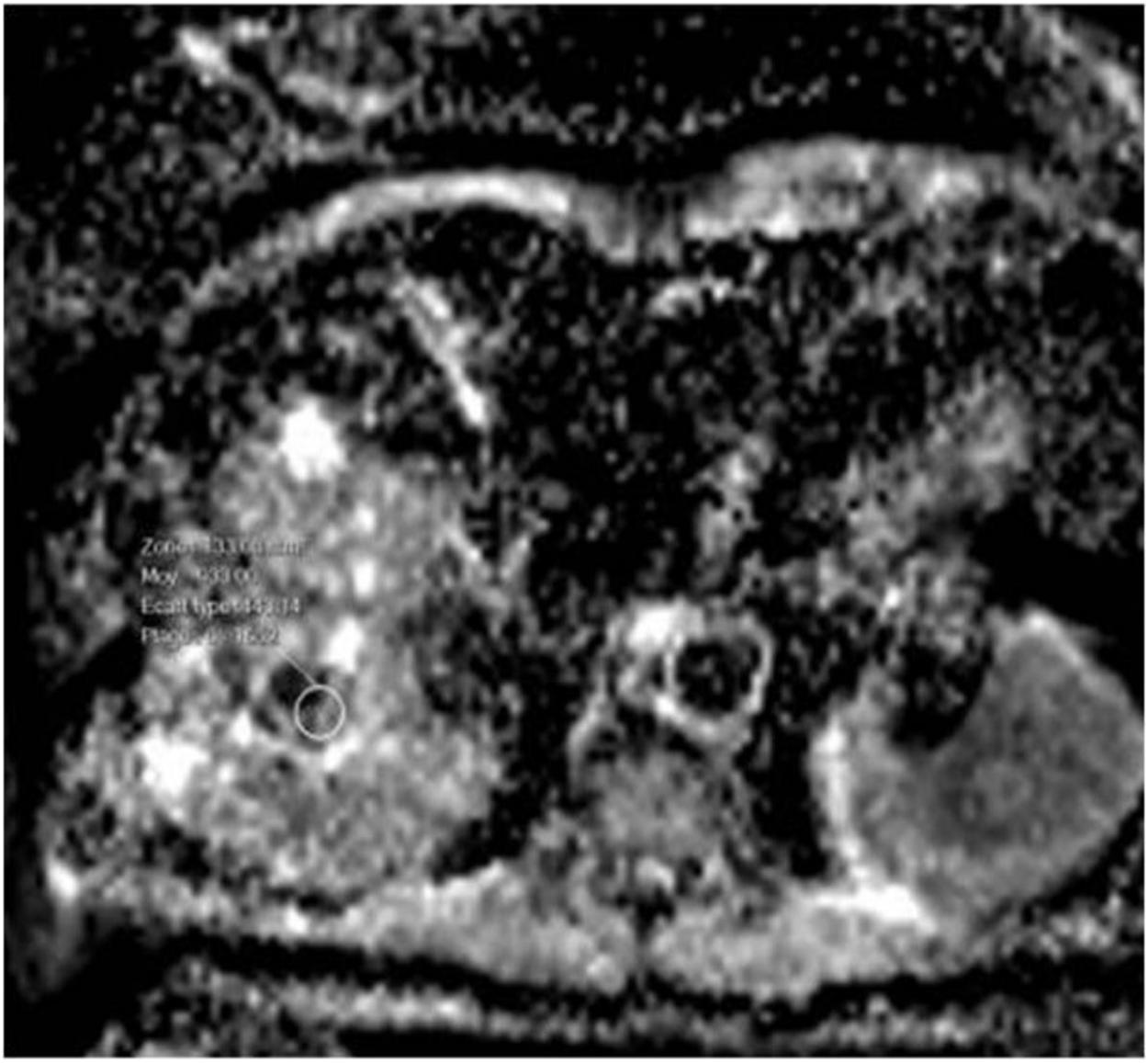

Fig. 4: ADC map.The same ROI from the DW-SS image has been transferred to the ADC map with an ADC mean of 0.85x 10 -3s/mm2

Results

The maximum diameter of the lesions was 71.mm (range 22-193mm).

There was no significant correlation demonstrated between the different patterns of contrast enhancement and the lesions ADC's$_{mean}$ (all p>0.05).

The mean ADC value of inthahepatic cholangiocarcinoma (ICCA) was estimated 1.30± 0.24 x 10^{-3} mm^2 /s.

The mean ADC measurements did not seem to reflet the typical underlying fibrosis occuring in ICCA.

Images for this section:

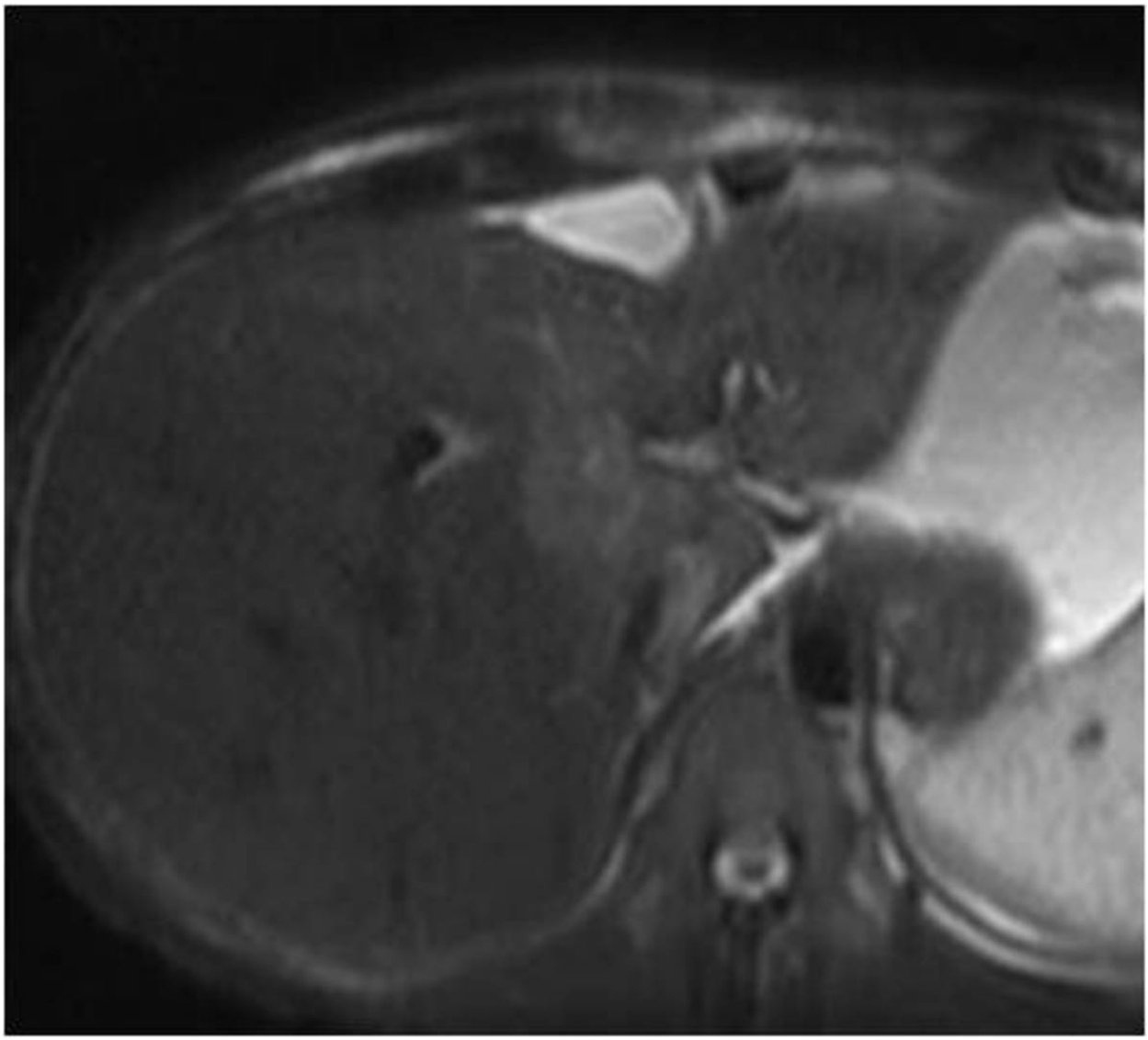

Fig. 7: T2HASTE weighted image demonstrating a moderately hyperintense lesion with intrahepatic dilatated biliary ducts in the mass.

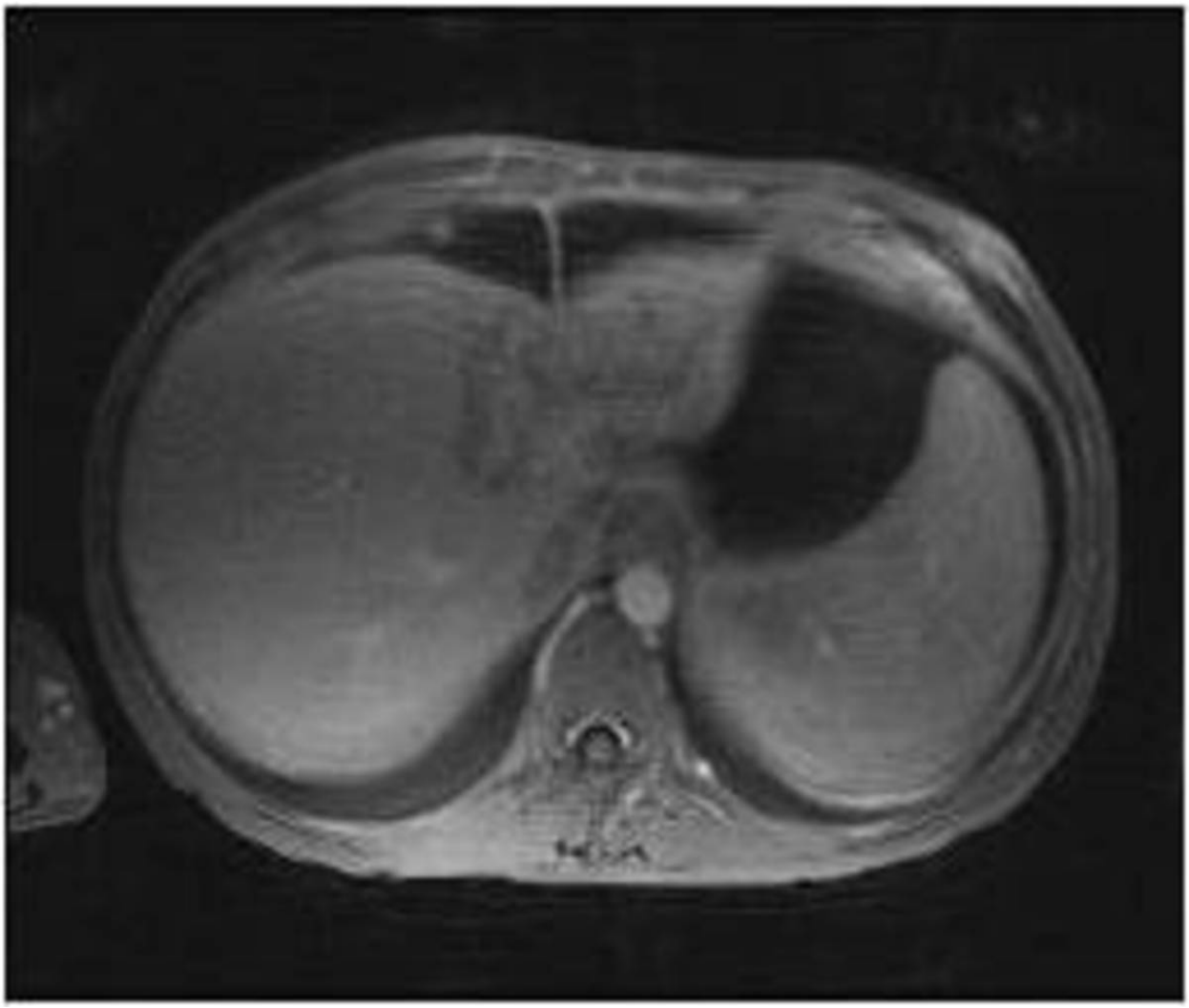

Fig. 8: Contrast enhanced T1 weighted image shows poorly enhancing lesion associated to moderate parenchymal atrophy with capsular retraction

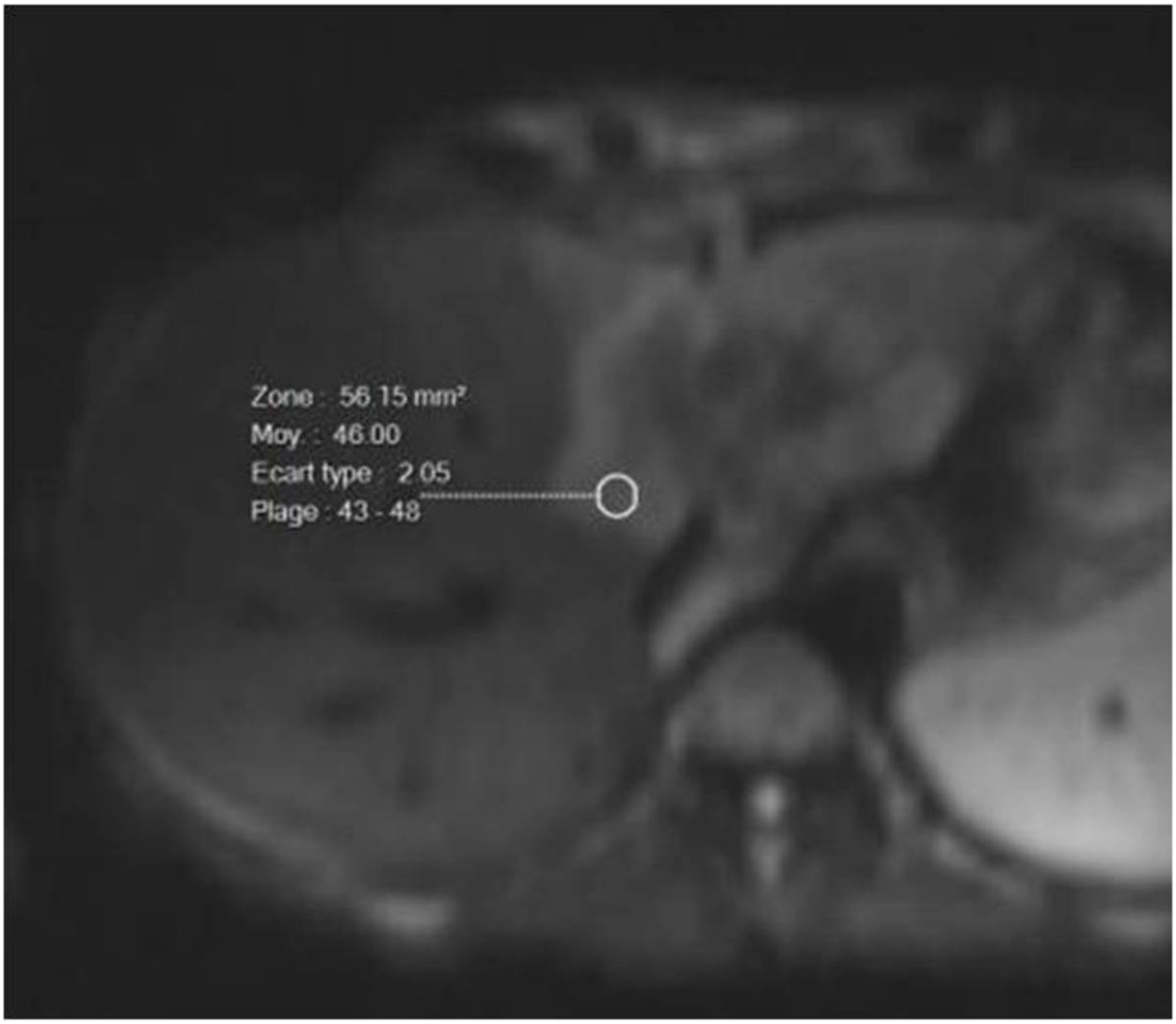

Fig. 9: DW-SS.EPI image with b=600 s/mm2 with ROI placed in the periphery of the lesion

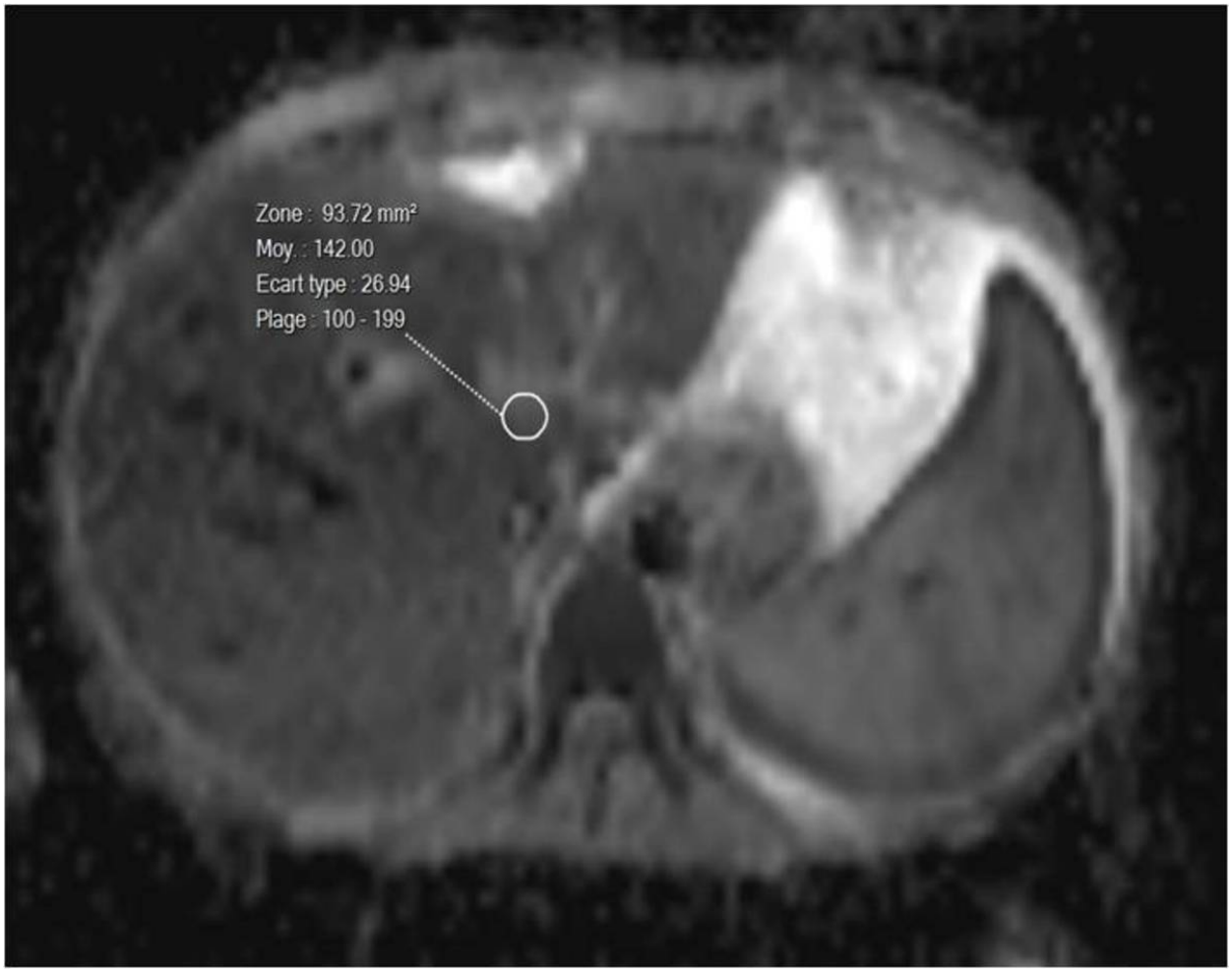

Fig. 10: On the corresponding ADC map the lesion shows a low ADC value (1.55 x 10-3 mm/s2)

Conclusion

The ADC_{mean} of intrahepatic mass-forming cholangiocarcinoma (ICCA) is relatively low compared to the ADC_{mean} of most focal liver lesions, thus indicating a malignant origin.

However, the ADC_{mean} of ICCA is slighty higher than previously reported ADC values of other malignant lesions, thus in addition to the information obtained by the T2-weighted and T1-weighted contrast-enhanced MR-images , it may be helpful in narrowing the differential diagnosis.

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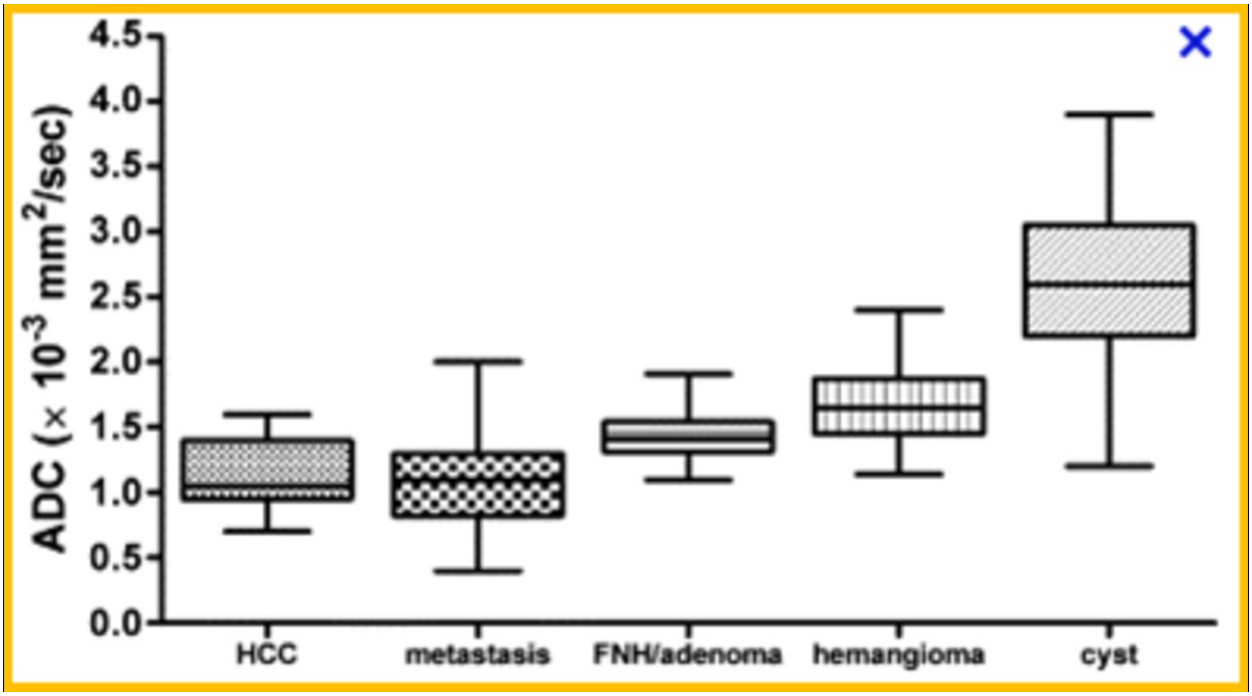

Fig. 6

References

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Personal Information