Objective post-mortem body fat evaluation in cats

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Conclusions

- **The falciform ligament fat weight/femur length ratio (FFR) reflects the total body fat volume**
- **The results indicate that the FFR can be used to objectively evaluate the amount of body fat in cats at post-mortem examination**

Fig. 1. MDCT fat evaluation. a) Mid-abdominal image slice of a cat . b) Image slice showing fat (black) information only . c) Whole-body adipose (*) and soft (#) tissue voxel frequency. Fat volumes were calculated by multiplying the number of adipose tissue voxels with voxel size.

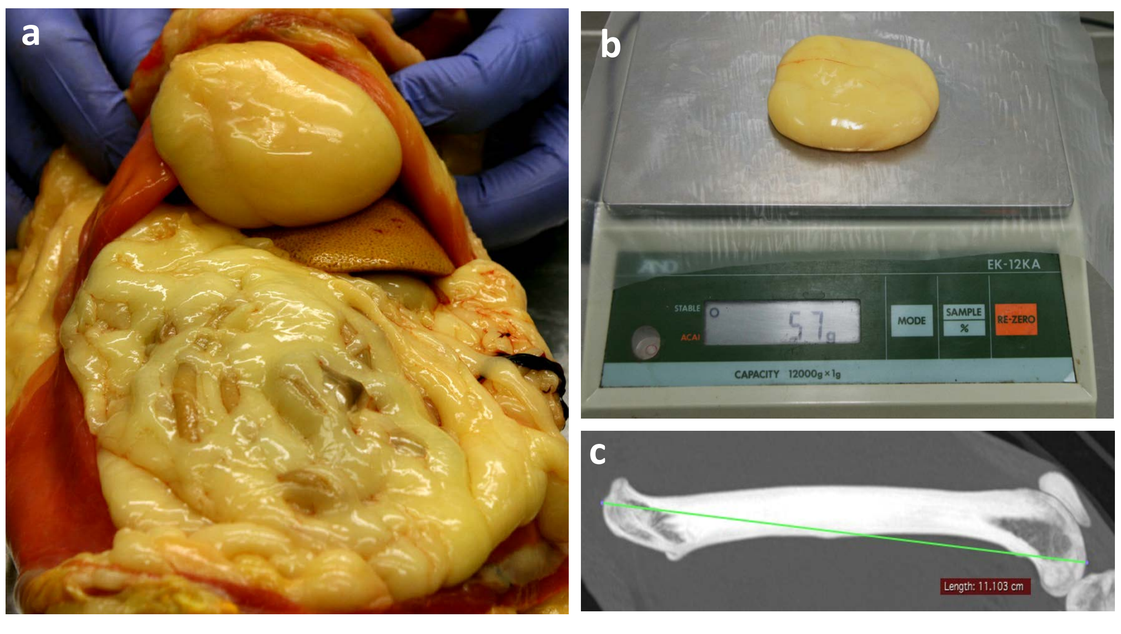

Fig. 2. Examples of evaluated parameters. a) Subjective assessment of the amount of fat in the falciform ligament and the greater omentum. b) Weight of the falciform ligament recorded on digital scales. c) Femur length measured in MDCT image.

Background and aim

As overweight and obese pet animals are becoming more common, methods for fat evaluation are becoming increasingly important. Presence of body fat is commonly subjectively evaluated at routine post-mortem examinations. However, establishing objective criteria to determine amount of body fat may help to accurately classify body condition in regard to fat.
The aim of this study was to develop a method for objective body fat evaluation in post-mortem examinations in cats.

Material and methods

Twenty three cats were evaluated for amount of fat post-mortem. In 13 of the cats whole-body multidetector computed tomography (MDCT) was done, and total fat volumes (FV) calculated from the MDCT images (Fig. 1).
At post-mortem examination the amount of subcutaneous, intraabdominal, retroperitoneal and pericardial fat was assessed, and overall body condition in regard to amount of body fat was subjectively determined. The weight of the falciform ligament (FaL) was recorded on digital scales (Fig. 2).
In order to be able to compare fat measurements between cats of different sizes, the total bone volume (BV) was also calculated for each of the 13 cats that had MDCT and the length of the right femur was measured in all cats either in MDCT images (Fig. 2) and/or at post-mortem using calipers. Thereafter, ratios between fat and bone measurements were calculated. Linear regression was used to determine correlations between FaL/BV and FV/BV ratios, between femur lengths and BV, and between femur lengths measured in MDCT images and at post-mortem examination. FaL (g)/femur length ratios (cm) (FFR) were calculated and correlated to FV/BV ratios. An interval value plot of FFR compared to post-mortem grading of body condition was made to investigate the agreement between the methods.

Results

There was a significant correlation between FaL/BV and FV/BV ratios ($P<0.0005$, $R^2=75.0\%$), between femur lengths and BV ($P<0.0005$, $R^2=86.1\%$) (Fig. 3) and between femur length measured in MDCT images and at post-mortem examination ($P<0.0005$, $R^2=98.8\%$). In addition, there was a significant correlation between FFR and FV/BV ratios ($P<0.0005$, $R^2=70.5\%$), and good agreement between the FFR and body condition at post-mortem examination (Fig.3).

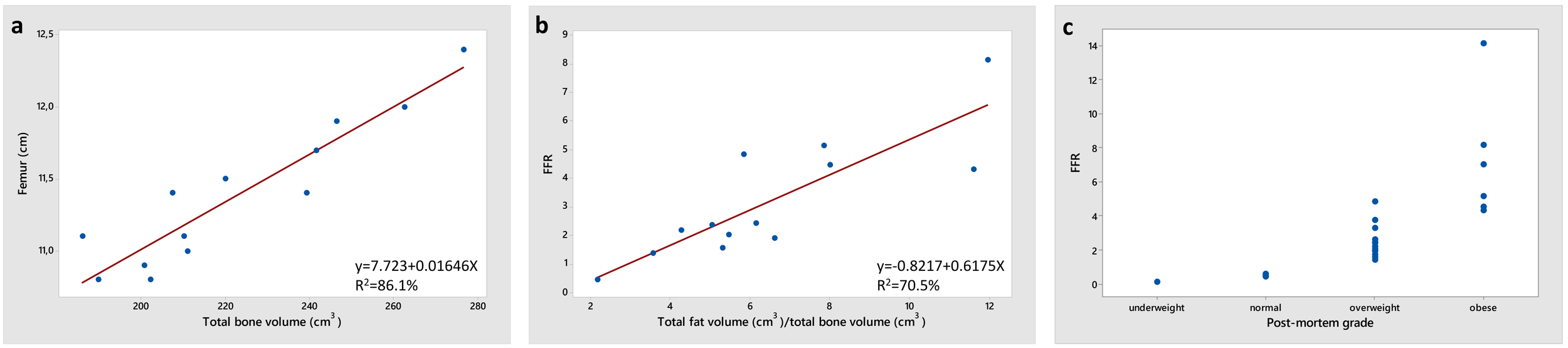

Fig. 3. a) There was a significant correlation between femur lengths and total bone volumes ($P<0.0005$) and b) between falciform ligament weight/femur length ratios (FFR) and total fat volume/total bone volume ratios ($P<0.0005$), n=13. c) Subjective determination of body condition at post-mortem and FFR showed good agreement, n=23.

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