TACSM Abstract

Ectopic Bone in the Kidneys and Visceral Fat of Male Fischer-344 Rats

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ABSTRACT

Ossified particles (OSP) are microscopic, bone-like fragments found in the circulatory system of rodents and humans. Although theorized to develop in the bone marrow, their origin and impact on physiological processes are unknown. Further, the fate of OSP has not been determined and may exit the circulatory system and enter organs and tissues. **PURPOSE**: We sought to detect the presence of ectopic bone in the kidneys and visceral fat of rodents. **METHODS:** Young (6-mon; n=10) and old (24-mon; n=10) male Fischer-344 rats were anesthetized with isoflurane (3% to oxygen balance) and euthanized by excising the heart. The right and left kidneys and a segment of visceral fat were dissected, weighed (g), fixed in 10% formalin for 3 days at 4°C, and stored in 70% EtOH at -20°C. Tissues were subsequently analyzed via micro-computed tomography (μCT 45; Scanco Medical, Inc. Switzerland) and scanned at 15 μm. The following data were analyzed using One-Way ANOVAs (SPSS v29) and reported as follows: body mass (g), right kidney mass (g), left kidney mass (g), visceral fat mass (g), bone volume in the right kidney (μm^3), bone volume in the left kidney (μm^3), bone volume in the visceral fat (μm^3), bone volume relative to right kidney mass ($\mu m^3/g$), bone volume relative to left kidney mass ($\mu m^3/g$), and bone volume relative to visceral fat mass ($\mu m^3/g$). A p value of 0.05 was set *a priori*. Data are presented as Mean ± Standard deviation. **RESULTS**: Body mass was higher ($p<0.05$) in the old vs. young rats (400 ± 31g vs. 352 ± 27g, respectively). Right kidney mass (1.35 ± 0.20g vs. 1.09 ± 0.13g, respectively), left kidney mass (1.37 ± 0.20g vs. 1.11 ± 0.12g, respectively) and visceral fat mass (3.25 ± 0.26g vs. 1.89 ± 0.42g, respectively) were higher ($p<0.05$) in old vs. young rats. Bone volume in the right kidney (0.65 ± 0.56 μm^3 vs. 0.62 ± 0.43 μm^3, respectively), left kidney (0.51 ± 0.59 μm^3 vs. 0.96 ± 0.86μm^3, respectively) and visceral fat (0.98 ± 0.59 μm^3 vs. 2.43 ± 04.35 μm^3, respectively) did not differ between young and old rats. Further, there were still no differences when bone volume was normalized to right kidney mass (young, 0.47 ± 0.36 $\mu m^3/g$ vs. old, 0.49 ± 0.27 $\mu m^3/g$), left kidney mass (young, 0.41 ± 0.53 $\mu m^3/g$ vs. old, 0.79 ± 0.70 $\mu m^3/g$) and visceral fat mass (young, 0.58 ± 0.48 $\mu m^3/g$ vs. old, 0.79. ± 1.48 $\mu m^3/g$). **CONCLUSION**: Advancing age did not augment the volume of bone in the kidneys and visceral fat. Despite this, the presence of bone in organs and tissues may affect physiological processes and should be explored. Further, we suggest a potential link between circulating OSP and ectopic bone observed in the organs and tissue of these rodents.

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