Abstract

Cats have characteristics to tend to be obese accompanying with insulin resistance. Obesity is risk factors for serious metabolic disorders like diabetes mellitus, cardiovascular disease and hypertension. Prevention of obesity is most important for cats to avoid serious metabolic disorders. The aim of the thesis is development of early diagnosis of obesity for cats. To make objective index for obesity of cat, plasma metabolite concentrations and some parts of body (measured anatomic sites) were measured. 243 cats were divided into some groups based on sex, age, castration and obesity stages. Male cats show higher tendency to become obese and insulin resistance than female cats. Ectopic lipid accumulation in liver and chronic kidney disease (CKD) are often found in the aged cats. In the castrated cats, 4-fold higher plasma triglyceride (TG) concentrations are found than those in the non-castrated cats. In early stage overfed (overweight) cats with overfeeding for 4weeks, plasma TG and non-esterified fatty acid (NEFA) concentrations and alanine aminotransferase (ALT) activities significantly increased. These increases may result in insulin resistance caused by ectopic lipid accumulation in visceral tissues. To diagnose early stage obesity exactly, new index for cat (feline body mass index, fBMI) was settled as body weight (kg)/length from top of patella to end of calcaneus (PCL, m). PCL is measured easily without sedative for cats. fBMI increased significantly in early stage obese cats, and correlated positively to body weight, body condition score (BCS), neck girth, and plasma NEFA. fBMI is suggested to be available diagnostic index for obesity. In overfed cats fed on high-fat diet with overfeeding for 6weeks followed by reducing body weight with low-calorie diet for 4weeks, fBMI changed sharply reflecting changes in BW and plasma TG and NEFA and fBMI was

confirmed as useful index for feline obesity (fBMI≧28.0 as overweight). Measurement of fBMI does not need blood sampling from animals and specific tools except simple tape measure. fBMI is very suitable index for veterinary medicine and can be available for diagnosis of early stage obesity before metabolic syndrome.