Dexmedetomidine pharmacokinetics in the obese

Cita: Cortínez, L., Anderson, B., Holford, N., Puga, V., De La Fuente, N., Auad, H., … Ibacache, M. (2015). Dexmedetomidine pharmacokinetics in the obese. *European Journal of Clinical Pharmacology, 71*(12), pp. 1501-1508. https://doi.org/10.1007/s00228-015-1948-2

Abstract

Purpose

This study aims to characterize the influence of body weight and composition on the pharmacokinetics of dexmedetomidine.

Methods

Twenty obese patients and 20 non-obese patients scheduled for elective laparoscopic surgery were given dexmedetomidine infusion schemes. Venous blood samples were taken during and after dexmedetomidine administration. Population pharmacokinetic modeling was undertaken to investigate fat free mass (FFM) and normal fat mass (NFM) as size descriptors of volumes and clearances using non-linear mixed effects modeling. NFM partitions total body weight into FFM and fat mass calculated from total body weight (TBW) minus FFM. The relative influence of fat mass compared to FFM is described by the fraction of fat mass that makes fat equivalent to FFM (Ffat).

Results

Theory-based allometric scaling using FFM best described weight and body composition differences in clearances and volumes A negative effect of fat mass of with an exponential parameter of −0.00541/kg (95 % CI −0.0118 to −0.00246) was estimated for clearance which indicates increased fat mass is associated with impairment of clearance.

Conclusions

The use of theory-based allometry with predictions of fat free mass has been able to separate the influences of weight and body composition and indicates that size-normalized clearance of dexmedetomidine is impaired in patients who are obese.