



K36 A Review of Succinylmonocholine Concentrations in Body Fluids and Tissues Analyzed by LC-MS/MS

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The objective of this data compilation was to summarize analytical findings for succinylmonocholine from a wide variety of forensic and clinical specimen types obtained over a period spanning four years, along with a statistical analysis of the data set; also, the identification of basal levels of succinylmonocholine in normal postmortem mammalian tissues.

Demonstration of presence of succinylmonocholine in postmortem tissue samples known not to have been exposed to succinylcholine, and presentation of levels of this compound in a variety of postmortem samples.

Succinylmonocholine is the initial breakdown product of succinylcholine (succinylidicholine), a quaternary ammonium neuromuscular blocking agent often used during surgical procedures. Succinylmonocholine is rapidly generated as a metabolite from succinylcholine by cholinesterase enzymes and, more slowly, by chemical degradative processes. Very seldom is succinylcholine itself detected, due to its very short half-life in biological systems; rather, its more stable initial metabolite, succinylmonocholine, is detected. Succinylmonocholine further breaks down to succinic acid and choline, both of which are found as normal constituents in biological matrices.

Succinylmonocholine is of forensic toxicological interest because, as the initial metabolite of succinylcholine, it is potentially useful for the identification of exposure to succinylcholine, particularly in suspected poisoning cases. In conjunction with such forensic cases (as well as numerous clinical cases), this laboratory has analyzed a wide variety of specimen types for succinylmonocholine (and other quaternary ammonium neuromuscular blocking drugs including succinylcholine itself). The analyses were performed using an initial liquid-liquid extraction procedure, followed by a reverse phase ion-pairing solid phase extraction procedure. The final extracts were analyzed for neuromuscular blocking agents by high performance liquid chromatography tandem mass spectrometry (LC-MS/MS), using either a tandem quadrupole instrument or a hybrid tandem quadrupole-time of flight (Q TOF) instrument.

Analytical samples varied widely in age and condition, ranging from relatively fresh clinical specimens to embalmed, exhumed specimens up to ten years old. Specimen types included: kidney, liver, brain, diaphragm, lung, urinary bladder, spleen, psoas muscle, urine, blood from various sources, skin, buttock, thigh muscle, mixed tissue, right biceps, clots from various locations, fat, kidney fluid, liver fluid, serum, renal medulla, renal cortex, formalin, plasma, bile, and bone marrow. More than 250 individual specimens were analyzed over a four-year period. Analytical findings ranged from none detected (with a typical detection limit of 1 ng/g) in most specimens to an extreme value of 7400 ng/ml in a clinical urine sample. Data from all of these analyses will be presented along with statistical analysis of the data set. Of significant interest is the identification of basal levels of succinylmonocholine in fresh autopsy specimens from individuals known not to have been exposed to succinylcholine prior to death. Typical values for these specimens were in the 10-30 ng/g range for postmortem human liver and kidney, with similar values also observed for bovine and porcine tissues. We are not aware of any prior literature documenting the presence of succinylmonocholine in normal postmortem mammalian tissues.

Succinylmonocholine, Postmortem, Tissue Concentrations