Pharmacokinetic (PK) Differences Between Subcutaneous and Intramuscular Administration of Lanreotide: Results from a Phase I Study

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Background: Recent data have shown that ~38% of intended gluteal intramuscular (IM) injections with long-acting release octreotide were mistakenly given subcutaneously (SC); in carcinoid syndrome patients, this significantly increased the rate of flushing (P=0.005; Boyd 2013, Pancreas). Lanreotide depot (LAN) recently became the first somatostatin analogue FDA-approved for the treatment of gastroenteropancreatic neuroendocrine tumors (120 mg Q4W) as a deep SC injection. Since LAN efficacy and pharmacokinetics have been demonstrated, including rapid initial release and long half-life of 23-30 days, we report pharmacokinetic parameters of SC vs IM routes of administration.

Methods: In a phase I study, healthy adult volunteers received 1 mg lanreotide immediate release formulation (IV bolus) followed by 60 mg 0.246 mg/mg deep SC or IM lanreotide depot. Serial blood samples were analyzed.

Results: Of 42 volunteers (mean [SD] age 25±6 years, weight 66±10 kg), 11 received the same LAN dose (60 mg 0.246 mg/mg) as SC (n=5) or IM (n=6), 30 received other doses/concentrations, and 1 was excluded. Between 14 and 112 d, comparable mean concentration-time profiles were observed for both routes. The mean Cmax (5.8±4 vs 6.8±3 µg/L) and mean T1/2 (33±14 vs 23±9 d) were deemed comparable, as were median Tmax (8 vs 16 hours) and median residence time (last) in serum (28 vs 20 d). Slightly lower AUClast (1651±54 vs 2007±172 h•µg/L) and AUCinf (1843±134 vs 2100±193 h•µg/L) were observed with SC vs IM injections.

Conclusion: For long-acting octreotide, intended gluteal IM injections are often given SC. Lanreotide depot 60 mg 0.246 mg/mg SC and IM injection had similar PK profiles in this small cohort, leading to further development of SC, due to more lanreotide availability in the late-release phase after SC injection.

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