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Gluteal Intramuscular Injections: CT Evaluation of Factors Associated with Success and Failure

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Background: Gluteal intramuscular injection remains an important method for delivery of a variety of medications including octreotide LAR. In one study, only 32% of intended gluteal injections were delivered into the intramuscular space (Chan et al, Eur J Radiol. 2006).

Methods: Patients receiving intramuscular injection of octreotide LAR at the Gastrointestinal Center, University of Texas M. D. Anderson Cancer center were identified. Pelvic CTs were reviewed for injection success and measurement of injection depth, skin to muscle depth at injection site and at optimal injection site.

Results: 251 intended intramuscular injections between 12/21/2005 and 6/25/2008 were evaluated. 105 (42%) were associated with subcutaneous nodules (mean size 19 mm) indicating subcutaneous placement; 146 (58%) were deemed successful intramuscular injection. CT assessed reasons for missed injections include insufficient needle penetration (36%), injection site being too cranial (36%), lateral (11%), caudal (9%), and insufficient needle length (10%). Among missed injections, mean distances are: skin to injection deposit, 29 (12–57) mm; injection deposit to muscle, 15 (1-94) mm; skin to tissue sciatic nerve plane, 72 (43–103) mm. Among all injections, the mean distance from skin to muscle at optimal injection site and from skin to sciatic nerve plane is 29 (9-63) mm, and 58 (38-108) mm respectively. Percentage of all patients with skin to muscle depth at optimal injection site ≤33 mm, and ≤38 mm are 66%, and 86%. Successful, intramuscular injection rate is higher among patient with skin to muscle depth at optimal injection site ≤38 mm (64% vs 21%; $P<0.001$).

Conclusion: Common reasons for unsuccessful intramuscular injection are poor injection site selection, and not advancing needle to full length. In 14 to 34% of patients, needles greater than 38 mm (length of needle available in US) would be needed for successful intramuscular injection.