Male hypogonadism is receiving more attention from patients, their physicians, and the media. Testosterone replacement is often intramuscular (IM), but newer routes of delivery including buccal, transdermal, and pellet implants exist. Polycythemia is a recognized adverse effect of IM testosterone. This adverse effect has been reported rarely with transdermal testosterone (TDT) replacement. In fact, topical application of testosterone has been used to reverse the polycythemia associated with IM treatment. We report a case of polycythemia occurring with the use of transdermal testosterone gel and discuss the implications for the practicing clinician.

**Is Polycythemia a Rare Complication of Transdermal Testosterone?**

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**Introduction**

A 71 year male physician was referred for gynecomastia with breast tenderness. The gynecomastia was sufficiently disconcerting to the patient that he stopped swimming, an activity he previously enjoyed. Patient denied decreased sexual function. Patient had osteopenia, and had a transurethral resection for benign prostate hyperplasia. Medications included only fish oil, vitamin C, and vitamin D3. There was no significant family history. Physical exam was significant for gynecomastia and testicular atrophy. Laboratory values showed FSH 43.4 [1-8] mIU/ml, LH 16.6 [1.5-9.3] mIU/ml, PSA of 0.465 [0.4-4.0] ng/ml and testosterone of 236 [350-720] ng/dl, Hb 15.8 g/dL, and hematocrit of 49 %. Other lab values including estradiol, estrone, and total estrogens were within normal limits. The patient was placed on Androgel Pump Gel 1.62%, 2 pumps daily (testosterone 40.5mg/day). When the patient returned for annual follow-up, hemoglobin had increased to 18.6 and hematocrit had increased to 53%. The patient was asymptomatic. Medications were reviewed and testosterone was discontinued.

**Case Description**

Compared with IM administration, TDT has been shown to provide a more physiological and stable levels of testosterone and an improved side-effect profile. Moreover, polycythemia appeared significantly reduced in transdermal as opposed to IM administration, likely by eliminating the peak and trough effect of IM injection on bone marrow erythropoiesis. As such, the polycythemia in our patient was highly unusual and rarely reported. It is not known if the mechanisms inducing polycythemia with TDT are the same as with IM testosterone. The Endocrine Society Guidelines on androgen deficiency syndromes in men recommend monitoring patient for polycythemia 3 months after initiation of therapy. There are currently no guidelines specifically concerning screening patients on transdermal testosterone. Monitoring may be less rigorous given the reduced side-effects reported with this form of delivery. The occurrence of this rare complication in our patient suggests that clinicians should not dismiss the risk of polycythemia with transdermal use. Undiagnosed polycythemia in association with transdermal testosterone may be more common than previously thought, and may depend on dosage and delivery mechanism as shown in Figure 1. Additional research may lead to guidelines which are more specific for monitoring patients with transdermal testosterone therapy.

**References**


Prescribing Information, Androgel 1% and Androgel 1.62%. www.androgelpro.com
