

IN A COHORT OF TRANSGENDER INDIVIDUALS UNDERGOING GENDER-AFFIRMING HORMONAL THERAPY

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PURPOSE

The aim of our analysis is to evaluate bone health status in a cohort of transgender men undergoing Gender-affirming hormone therapy (GAHT) and a possible correlation between hormonal parameters (Testosterone, Estradiol, LH, FSH) and densitometric parameters (BMD, T-Score, Z-Score) obtained through DEXA scanning. Additionally, our study analysed how GAHT and hysterectomy are related to the patients' bone health over time.

METHODS

Twenty-one Female-to-Male transgender patients (FtM) were selected. All patients undergo GAHT with intramuscular Testosterone Undecanoate (1000 mg every 12 to 16 weeks) and have undergone hysterectomy. Patients had a median age at therapy initiation of 20.0 years (19.0-31.5), while the median age at the time of hysterectomy was 27.0 years (22.0-34.0). In the same year of their hysterectomy and afterward, all patients underwent a DXA scan in which BMD, T-score and Z-score were measured at the lumbar spine, total femur, and femur neck. Additionally, biochemical markers of bone metabolism, including calcium, phosphorus, and vitamin D, were assessed, along with hormonal parameters such as serum total testosterone, estradiol, LH, and FSH.

Descriptive analysis

N	21
Age at GAHT	20.0 (19.0-31.5)
Age at hysterectomy	27.0 (22.0-34.0)
Years of GAHT before surgery	4.0 (2.5-4.5)
Serum estradiol (pg/ml)	33.0 (26.0-43.0)
Serum total testosterone (ng/dl)	750.0 (636.0-841.0)
Serum LH (mIU/ml)	4.0 (1.0-23.0)
Serum FSH (mIU/ml)	14.1 (4.4-50.8)
Serum Calcium (mg/dl)	9.7 (9.2-10.8)
Serum Phosphorus (mg/dl)	3.6 (3.2-4.1)
Serum vitamin D (ng/ml)	24.0 (18.5-32.0)
BMI (kg/m ²)	26.8 (22.5-28.4)
Lumbar L1-L4 Tscore	-2.0 (-2.5 - -1.5)
Lumbar L1-L4 Zscore	-1.8 (-2.2 - -1.3)
Lumbar L1-L4 BMD (g/cm ²)	0.939 (0.870-1.050)
Total femur Tscore	-2.1 (-2.4 - -1.5)
Total femur Zscore	-1.8 (-2.1 - -1.2)
Total femur BMD (g/cm ²)	0.900 (0.830-1.010)
Femur neck Tscore	-2.6 (-2.9 - -2.0)
Femur neck Zscore	-2.2 (-2.5 - -1.7)
Femur neck BMD (g/cm ²)	0.820 (0.740-0.930)

RESULTS

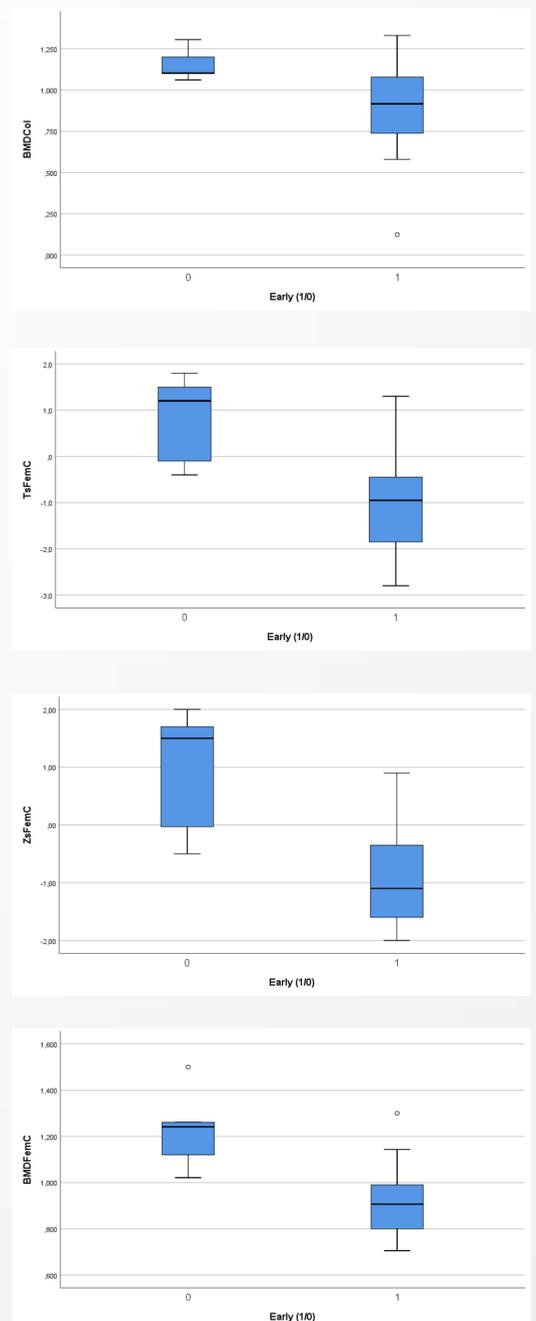
Higher T-scores and BMD values at the femur neck were observed in patients with a longer duration of GAHT before surgical intervention ($\rho_s = 0.412$ $p = 0.32$ for T-score and $\rho_s = 0.380$ $p = 0.45$ for BMD, respectively). A correlation with lumbar spine BMD was also noted, although it did not reach statistical significance. No significant correlation was found between biochemical parameters related to sex hormones (total testosterone, estradiol, FSH, LH) and the densitometric values in patients who underwent surgery. Statistical analysis using the Mann-Whitney test further confirmed that patients who underwent hysterectomy after four years of hormone therapy exhibited significantly higher BMD values than those who had surgery earlier. Notably, the early-treated group had worse densitometric parameters, with lower BMD at both the lumbar spine ($U = 13.5$, $Z = -2.189$, $p = 0.029$), and across all parameters at the femur neck compared to those who underwent hysterectomy after a longer period on GAHT ($U = 6.5$, $Z = -2.769$, $p = 0.06$ for T-score, $U = 8.0$, $Z = -2.644$, $p = 0.008$ for Z-score and $U = 6.0$, $Z = -2.808$, $p = 0.05$ for BMD, respectively).

One-tailed Spearman's correlation analysis

		Age at GAHT	Age at hysterectomy	Years of GAHT before	Lumbar L1-L4 Tscore	Lumbar L1-L4 Zscore	Lumbar L1-L4 BMD	Total femur Tscore	Total femur Zscore	Total femur BMD	Femur neck Tscore	Femur neck Zscore	Femur neck BMD
Age at GAHT	ρ_s	1,000	0,972	0,093	-0,584	-0,439	-0,366	-0,764	-0,744	-0,580	-0,612	-0,578	-0,514
	p	.	0,000	0,344	0,003	0,023	0,052	0,000	0,000	0,003	0,002	0,003	0,009
	N	21	21	21	21	21	21	21	21	21	21	21	21
Age at hysterectomy	ρ_s	0,972	1,000	0,165	-0,545	-0,376	-0,280	-0,754	-0,669	-0,524	-0,530	-0,488	-0,416
	p	0,000	.	0,237	0,005	0,047	0,109	0,000	0,000	0,007	0,007	0,012	0,030
	N	21	21	21	21	21	21	21	21	21	21	21	21
Years of GAHT before hystere.	ρ_s	0,093	0,165	1,000	-0,049	0,136	0,336	0,011	0,110	0,072	0,412	0,342	0,380
	p	0,344	0,237	.	0,417	0,279	0,068	0,481	0,318	0,379	0,032	0,065	0,045
	N	21	21	21	21	21	21	21	21	21	21	21	21

Mann-Whitney test

	Lumbar L1-L4 Tscore	Lumbar L1-L4 Zscore	Lumbar L1-L4 BMD	Total femur Tscore	Total femur Zscore	Total femur BMD	Femur neck Tscore	Femur neck Zscore	Femur neck BMD
U	23,500	19,000	13,500	23,500	16,000	22,000	6,500	8,000	6,000
Z	-1,364	-1,737	-2,189	-1,363	-1,987	-1,487	-2,769	-2,644	-2,808
p	,173	,082	,029	,173	,047	,137	,006	,008	,005



CONCLUSIONS

Our findings indicate that BMD and T-scores at the femur neck were directly correlated to the number of years on GAHT prior to surgery, supporting the hypothesis that prolonged testosterone therapy may exert a protective effect on bone health. This effect, however, was less evident in the lumbar spine. To further analyze this relationship, we stratified the study population based on GAHT duration before surgery. Notably, the early-surgery group (i.e. within four years after initiating GAHT) exhibited significantly lower densitometric parameters, with reduced BMD at the lumbar spine and across all parameters at the femur neck, compared to those who underwent surgery after a more extended duration of GAHT.