Does the LNG-IUD decrease BMD in adolescent females?

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Question

Does the levonorgestrel intrauterine device decrease bone mineral density in adolescent females?

Evidence- based Answer

We don't know. Use of a levonorgestrel intrauterine device (LNG-IUD) in women of 25 to 48 years does not appear to decrease bone mineral density (BMD) over seven to 10 years (SOR: C, three cohort studies of disease-oriented outcomes). In a case report of a 21-year-old patient, BMD decreased after eight years of use, with serum estradiol levels in the postmenopausal range and normalizing after LNG-IUD removal (SOR: C, single case report with mechanism-based reasoning).

Summarized Data Review

A cross-sectional study (N5106) examined bone mineral density (BMD) in women (25–51 years old) using either LNG-IUD or copper IUD (Cu-IUD) paired by age (mean age 34.2 vs 34.6) and body mass index (BMI) (mean BMI 25.8 vs 25.5).[1] Women with diagnoses or medications affecting BMD were excluded. The primary outcome was BMD via double x-ray absorptiometry (DXA) of the ulna and radius at seven years of continuous use of LNG-IUD or Cu-IUD.

Summarized Data Review

There were no differences in BMD of the ulna (0.47 vs 0.47; P5.82) or radius (0.41 vs 0.41; P5.84) between the groups (TABLE). A follow-up, prospective, longitudinal, cohort study of the same LNG-IUD users similarly matched with Cu-IUD users (N574) examined BMD via DXA in women (25–48 years old) at seven and 10 years of use.[2] There were no differences between the groups in BMD of the radius or ulna at either time point. Limitations of these studies included small sample sizes, lack of data on adolescents, and the use of disease-oriented outcomes.

A retrospective cohort study (N564) examined BMD in women (40–45 years old) using LNG-IUD or Cu-IUD matched by age (mean age 42.9 vs 42.3) and BMI (mean BMI 24.0 vs 23.2).[3] Women with risk factors affecting BMD were excluded. The primary outcome was BMD via DXA of the lumbar spine and total femur at baseline and after two years of use of LNG-IUD or Cu-IUD. There were no differences between the groups in BMD at either time point. Limitations of this study include small sample size, lack of data on adolescents, shorter follow-up times, and the use of disease-oriented outcomes.

TABLE 1. BMD (g/cm^2) after seven and 10 years of LNG-IUD versus Cu-IUD[2]

	LNG-IUD (N=37)	Cu-IUD (N=37)	P-value for comparison
Midshaft ulna 7 y	0.46	0.45	0.13
Ultra distal radius 7 y	0.40	0.39	0.59
Midshaft ulna 10 y	0.46	0.47	0.17
Ultra distal radius 10 y	0.40	0.41	0.51

A single case report of a young adult female using LNG-IUD showed decreased BMD and low estrogen levels after nearly eight years of use starting at age 21 years.[4] From year 6 of use until year 8 of use, she was noted to have T-scores at the femoral neck and distal radius ranging from –2.05 to –2.82 and Z-scores ranging from –1.95 to –2.73 as well as serum estradiol levels in postmenopausal ranges (8–59 mg/mL). After cessation of LNG-IUD, her estradiol level increased to normal levels; however, BMD was not measured again. No other secondary causes of her premenopausal osteoporosis were identified, leading the authors to conclude the LNG-IUD may have caused suppression of the hypophyseal-ovarian axis. Limitations of this report included limited follow-up and inability to exclude confounders such as genetic factors and low BMI (18.8 at the insertion of LNG-IUD).

References

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