Obesity Linked to Smaller Testes and Possible Infertility

Miriam E. Tucker
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Boys with obesity have lower testicular volume compared with their normal-weight counterparts, suggesting the potential for fertility problems in adulthood, new data suggest.

Testicular volume is a fertility marker directly related to sperm count that has halved in the past 40 years worldwide for unknown reasons. At the same time, childhood obesity has risen dramatically and infertility appears to have risen as well, Rossella Cannarella, MD, of the department of endocrinology and andrology, University of Catania, Italy, said during ENDO 2022: The Endocrine Society Annual Meeting.

According to recent Italian studies, between 14% and 23% of young men aged 18-19 had testicular hypotrophy. "Worryingly, we don't know the reason for this hypotrophy. And therefore, they are at risk for future infertility," Cannarella said during a press briefing.

Her study, which included a total of 264 male children and adolescents, also linked lower testicular volume to hyperinsulinemia and insulin resistance. "The testis is not quiescent in childhood and is sensitive to the hormone insulin. Obesity and metabolic impairment actually can have an effect and negative impact on Sertoli cell proliferation," Cannarella said.

Screen Testicular Volume at all Visits

If other studies confirm these results, she said that pediatricians should begin routinely assessing testicular volume at all visits as is now done with height and weight, to identify early deflection of the testicular growth curve.

And, "include male infertility as a possible consequence of obesity in counseling of male obese children," she advised.

Asked to comment, Amin Sedaghat Herati, MD, director of male infertility and men's health at Johns Hopkins Hospital, and assistant professor of urology at Johns Hopkins Medicine, Baltimore, Maryland, told *Medscape Medical News*: "I think what's really interesting about this study is the association that they've made between testicular volume and obesity."

But, he noted, "it does not implicate necessarily the development of infertility. It's an extrapolation. So it's a step towards the link between obesity and infertility, and it's an important study to establish the association, but changes in testicular volume and even changes in semen panel don't necessarily indicate fertility or infertility."

The findings are "consistent with what we know as far as what obesity can potentially do to the activity of the cells in the testes. The authors are postulating that it's more the support cells, called Sertoli cells, but I would say it's probably all of the cells that are being affected by obesity and specifically elevated leptin levels," Herati said.

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He agrees with the recommendation that pediatricians screen all boys for testicular volume. "I agree it's a good idea so they don't miss any cases in which the testes don't develop the way they should or any other conditions," Herati said. "I think in general it's a good practice, especially in the peripubertal stage, to make sure that kids are on the same growth curve and that they're meeting their Tanner staging. [Pediatricians] should be looking at the size of the testes and tracking, maybe not at every visit, but at least on an annual basis."

And, he noted, "I think any study that establishes a link that we can point to when we're educating patients and parents is important."

Links Found Between Overweight/Obesity, Testicular Hypotrophy

The study population included 61 male children and adolescents with normal weight, 53 with overweight, and 150 with obesity. Insulin resistance (HOMA-index ≥ 2.5) was present in 97 participants, 22 had prediabetes, and three had type 2 diabetes. Clinical data were collected retrospectively.

Among the boys aged 9-14 years, those with overweight and obesity had significantly lower testicular volume compared with those of normal weight.

Those who were in Tanner Stage 1 were more likely to have overweight and obesity than those with normal weight, suggesting that "overweight and obese adolescents start puberty later than those of normal weight," Cannarella said.

In the 14- to 16-year-old age group, those with insulin resistance had lower testicular volume compared to those without insulin resistance (HOMA-index < 2.5). The number of insulin resistant adolescents was greater than that of controls in the Tanner stage 2 group.

In both the prepubertal (< 9 years) and pubertal (14-16 years) groups, hyperinsulinemia was associated with lower levels of testicular volume.

Hyperinsulinemia did not influence the timing of puberty onset.

No Way to Quantify the Effect of Obesity on Fertility Just Yet

During a press briefing, Cannarella commented that obesity is likely just one of several factors influencing what appears to be an increase in male infertility over time. "It isn't of course the only reason, but many factors in our environment have drastically changed compared to 40 years ago, including the prevalence of heavy metals and endocrine disruptors, and of course, the change in habits and higher prevalence of metabolic disease. All of this has an impact on the proliferation of Sertoli cells in childhood and this may explain the trend toward the decline of sperm concentration and count."

Longitudinal data are needed to establish cause-and-effect, she noted. "We need longitudinal studies that link the degrees of testicular volume with the degree of the sperm concentration and count starting from childhood and ending with the adult age. This is the missing link so far," she said.

Cannarella has reported no relevant financial relationships. Herati has reported being an advisor for Dadi, LiNA Medical, and Teleflex.

Miriam E. Tucker is a freelance journalist based in the Washington, DC, area. She is a regular contributor to Medscape, with other work appearing in The Washington Post, NPR's Shots blog, and Diabetes Forecast magazine. She is on Twitter: @MiriamETucker.

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