Puberty-Menarche Age Link Weakening

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Unlike girls born at the turn of the last century, young girls today increasingly show minimal correlation between onset of puberty and age at menarche, reported Dr. Frank Biro and his colleagues.

In their study, 541 black girls and 615 white girls, all aged 9 years, were given annual exams over 10 years. At the start, 49% of the black girls and 77% of the white girls were prepubertal.

The participants, born in 1977 and 1978 and socioeconomically diverse, were recruited from public and parochial schools in Cincinnati, Richmond (California), and an HMO in Washington (J. Pediatr. 2006;148:234-40).

The onset of puberty was defined as "the age at areolar stage 2 or at pubic hair stage 2, whichever occurred earlier. Age of menarche was calculated from the date of birth to date of first menstrual period," said Dr. Biro of Cincinnati Children's Hospital Medical Center, and his colleagues.

At the end of the study only a moderate correlation was found between onset of puberty and age of menarche. The median age for onset of puberty for white girls was 10.2 years and a mean age at menarche was 12.6 years; for black girls, it was 9.6 years for onset of puberty and 12 years for age at menarche.

Participants completed puberty at a median age of 14.3 years for whites vs. 13.6 years for blacks. Blacks also had a significantly younger age for several other puberty parameters such as age at peak height velocity (11.5 years vs. 11.9 years for whites), end of puberty, defined as attainment of areolar 4/pubic hair 5 (13.6 years vs. 14.3 years for whites), and age at attainment of adult height (16.5 years vs. 17.1 years for whites).

The median interval between age at onset of puberty and start of menarche was 2.7 years for blacks and 2.5 years for whites.

Researchers contrasted their results to several earlier studies including a 1948 study by Dr. E. Reynolds and Dr. J. Wines that showed a very close correlation between onset of puberty and age of menarche for girls born during the 1930s (Am. J. Dis. Child. 1948;75:329-50). However, the 1999 Bogalusa Heart Study found that the median age of menarche had dropped by almost 10 months in blacks vs. 2 months in whites for the period between 1973 and 1994 (Ethn. Dis. 1999 Spring-Summer:181-9).

According to Dr. Biro and his colleagues, the age of onset of puberty may be influenced by interplay "between genes and the environment." The reasons for this "temporal drift" in the correlation results may "reflect interactions between body composition, environmental influences (such as endocrine disrupters) and genetic polymorphisms."

They took into account the possible role that fat, particularly leptin, might play in this decreasing correlation. Girls with earlier menarche tended to have higher BMIs, and "leptin appears to serve as a permissive factor for the onset of puberty. Leptin levels are greater in blacks, even with adjustment for fat mass and pubertal maturation." However, "the increases in relative weight …may be a consequence rather than a determinant of age of menarche, or secular changes in BMI and mean age at menarche could be independent phenomena," the investigators said.

Dr. Paul Kaplowitz, a pediatric endocrinologist at Children's National Medical Center, Washington, was not surprised by the study's results. "It confirms what many of us have seen, which is that there is a lot of variability in how rapidly different girls progress through puberty, Although in general, girls who develop breasts at an early age tend to reach menarche earlier, one can see menarche less than 2 or more than 4 years after the appearance of breasts," he said in an interview.

It is this individuality that must be weighed alongside treatment options. "Some kids are more worrisome than others because the signs of puberty progress more rapidly," said Dr. Kaplowitz. "If the only sign of puberty is a small amount of breast tissue or pubic hair, the [physician could] observe it for 4-8 months before deciding if it is necessary to refer to a specialist. If it is changing little over time and the growth rate is not rapid, it is unlikely that any treatment will be needed." ■