Inheritance of hormonal disorder marked by excessive insulin in daughters

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Elevated levels of insulin could be an early sign that girls whose mothers suffer from polycystic ovary syndrome -- or PCOS -- may also be susceptible to the disease, according to gynecologists who have found evidence of insulin resistance in young children.

The findings could help determine whether daughters of women suffering from PCOS are at a higher risk of developing the disease, compared to girls whose mothers do not have the disease.

Polycystic ovary syndrome is a common hormonal disorder that affects women of reproductive age, and sometimes causes inability to become pregnant. Symptoms include hairiness due to excessive amounts of male hormones, irregular periods, and insulin resistance.

"We found insulin resistance in children who had entered puberty, and whose mothers had PCOS," said Richard Legro, M.D., professor of obstetrics and gynecology, Penn State College of Medicine and lead author. "We did not find it in the youngest children, which suggests that the disease is triggered by puberty."

Legro and his colleagues were interested in finding out whether metabolic and reproductive abnormalities associated with the inheritable disease, are more likely to show up in children whose mothers have PCOS, and how parents could find out whether their child was at risk.

The researchers designed a study to compare 38 children -- boys and

girls aged 4 to 14 -- whose mothers had PCOS with 32 children in a control group. They specifically looked for the early onset of androgen -- male hormones -- production, and production of excess insulin.

"We collected samples of saliva and urine to analyze levels of insulin and sex steroids respectively," explained Legro. "But we also looked for gonadotropins, hormones that stimulate sex steroids and provide the earliest sign of puberty."

Results from the test indicate that older girls, but not boys, of PCOS mothers had significantly higher concentrations of salivary insulin. Compared to the control group, the girls also had lower levels of urinary hormones.

According to Legro, the key finding of the study is that insulin levels appear to be elevated in daughters of PCOS mothers, which becomes more pronounced as they pass through puberty. Since the androgen levels were comparatively normal throughout puberty, and insulin resistance was only found in girls who had undergone puberty, Legro argues that insulin is the primary problem, while male hormones are a secondary problem.

"Insulin is the real culprit in terms of stimulating the ovary, more so than gonadotropins, said Legro, whose findings appeared in a recent issue of The Journal of Clinical Endocrinology and Metabolism and was the subject of an editorial in the same issue.

"You could argue children of PCOS mothers build up excessive insulin during puberty, which in turn contributes to reproductive abnormality," explained Legro.

However, Legro cautions that it may be too early to conclude that excessive insulin is the sole factor that makes daughters of PCOS

mothers susceptible to the disease. He is also not fully sure whether hyperandrogenism -- excess of male hormones -- precedes or follows excessive levels of insulin.

Researchers say future longitudinal studies will focus only on girls and try to pin down whether an abnormal level of insulin is the sole factor that causes reproductive abnormalities.

"That is the tantalizing question," the Penn State medical researcher said. "The ultimate goal would be to find the earliest sign that makes a child more susceptible to develop PCOS. Right now the earliest sign would be an elevation in insulin levels."

Source: Penn State