Vital Signs: Misdiagnosing ADHD

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Just because it’s in vogue doesn’t mean it’s accurate.

by Mark Cohen

I was at my desk dictating a report when one of our pediatric endocrinologists knocked on my open door.

“Hi, Mark,” she said. “I have a 12-year-old patient whose mother is worried that she may have ADHD [attention deficit hyperactivity disorder]. She says her daughter has been getting more and more inattentive and disorganized and takes a long time to finish her homework. Her lab tests show that she might have resistance to thyroid hormone, which I know can cause ADHD symptoms. I’m not convinced she has that—because it’s pretty rare—but I’m also not sure she has ADHD. Since you know more about ADHD than I do, I’d like to get your opinion.”

This patient didn’t have ADHD. Something else was going on.

“I’ll be happy to take a look. I’ll let you know what I think after I see her.”

The young lady and her mother showed up about a week later, bringing a folder of report cards bearing A’s and B’s.

“How long have you been concerned about her?” I asked her mother.

“For about the past year or so she’s been having difficulty in school,” she replied. “She does her work, but then forgets to turn it in. She tells me it sometimes takes her four hours to do an hour’s worth of homework.”

These are common complaints regarding children with ADHD. ADHD is a chronic condition that causes inattention and difficulty in organizing. Most children with ADHD also show impulsivity and hyperactive behavior, but a sizable number have problems only with attention and focusing. The term ADHD is now used for the hyperactive and nonhyperactive forms of this disorder.

There is no specific laboratory test for ADHD. It is diagnosed by determining if a child has a significant number of inattentive, hyperactive, and impulsive symptoms; if they are excessive for the child’s age; if they have been present since early childhood and in more than one setting; and if they cannot be explained by some other physical, mental, or emotional condition. So I asked the girl’s mother questions designed to detect the symptoms of ADHD.
Her responses showed no hints of impulsivity or hyperactivity. That in itself wasn't a surprise. Children, especially girls, with the inattentive form of ADHD are often not diagnosed until middle school because of their lack of disruptive behavior. But as I continued questioning, it became clear that this patient did not have ADHD at all. Not only had her symptoms all started within the past year but she did not have enough of the ADHD symptoms to merit the diagnosis. Something else was going on.

Her chart noted that about six months previously her mother had brought up her daughter's picky appetite and slow growth. Because there was a family history of thyroid problems, the pediatrician had ordered basic blood tests of thyroid function, although she expected they would be normal. In fact, they were not—an important clue.

The thyroid gland, a small butterfly-shaped structure situated low in the front of the neck, controls the growth and metabolism of almost every organ in the body. It produces two related hormones, called T4 (or thyroxine) and T3 (or triiodothyronine). The release of these hormones is triggered by the pituitary gland, which secretes a substance called TSH (thyroid-stimulating hormone) that regulates thyroid production in a feedback loop. In hypothyroidism, the supply of thyroid hormones does not keep up with the body’s demands, and the TSH level is high, reflecting the body’s need to prod for more thyroid production. In hyperthyroidism, when the thyroid gland is producing too much of its hormones, the TSH level drops to zero.

In near hal the cases of hyperthyroidism in youths, the cause is an autoimmune condition known as Graves' disease. (The other half are caused by growths on the thyroid.) In Graves' disease, for some unknown reason the body begins to make antibodies against the thyroid gland, which makes the gland enlarge and produce more thyroid hormones. Typically, someone with this condition will have symptoms of hyperthyroidism, which can include fatigue, heat intolerance, sweating, palpitations (the physical awareness of a rapid heart rate), and weight loss.

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What had puzzled the endocrinologist about our patient was that her thyroid hormone levels were high, but her TSH was normal. This pattern is seen in the syndrome of resistance to thyroid hormone, a rare condition in which the body is insensitive to cues regulating the thyroid hormone feedback loop. I went back and reviewed the literature on ADHD and thyroid hormone resistance. When thyroid hormone resistance was first described in 1967, doctors noticed that the children had enlarged thyroids. Later on, doctors noticed that the children sometimes seemed hyperactive and nervous, resembling children with ADHD. For a time, checking the thyroid function of children with a diagnosis of ADHD was sometimes done. Eventually, doctors noticed that children with thyroid hormone resistance were more prone to learning disabilities than children with ADHD. Some were also inattentive and hyperactive.

This adolescent girl’s picture was becoming even more confusing. She had symptoms that looked like ADHD, but she clearly did not have ADHD. She had a high thyroid hormone level that looked like Graves’ disease but didn’t have the low TSH level that went with it. Although her blood tests suggested that her body’s thyroid-TSH feedback system wasn’t working properly, she didn’t display the ADHD-like symptoms of hyperactivity and nervousness that are typical of thyroid hormone resistance.

After the girl and her mother left, I walked down the hall to the endocrinologist's office. “Well, she doesn’t have ADHD,” I said. “And she doesn’t have the typical hyperactive symptoms that are described with thyroid hormone resistance. So I’m stumped.”

She smiled. “I was hoping you’d say that,” she said. “I don’t think she has thyroid hormone resistance. She’s got plain old Graves’ disease. She’s just hyperthyroid.”

“But what about the TSH?” I asked. “Shouldn’t that be low in Graves’ disease?”

“Yes, and that’s the tricky part. I was suspicious, because her symptoms didn’t fit the lab results, so I sent her blood to an academic lab in Chicago. They told me her TSH is actually very low. It turns out that she has an unusual antibody that reacts with the standard TSH test and gives a falsely high reading.”

“OK, but how does hyperthyroidism fit with her symptoms? I still can’t explain why she is so inattentive and disorganized.”

The endocrinologist then told me that in children and adolescents, the earliest indications of hyperthyroidism may be behavioral, like hyperactivity, nervousness, or moodiness. Forgetfulness and inattention—just like our patient’s symptoms—are common. That was something I hadn’t known, never having had a patient with early Graves’ disease, but it certainly
made sense.

We started our patient on methimazole, a medication that decreases the production of thyroid hormone. Within a few months, she was back to earning straight A's and finishing her homework in nothing flat. Her mother was thrilled. So was I.