

You're the Flight Surgeon

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Monday morning sick call is notoriously busy and today is no exception. Among the 14 patients in the waiting room, you notice an all-too-familiar name on the schedule. This particular 22-yr-old male AC-130W flight engineer has been to sick call nearly weekly for the past 2 mo. Having talked to others in the squadron, you know he is not excelling in his training and the line's impression is that he is not motivated to succeed. He is overweight and struggles to pass his physical fitness test. His previous complaints have included sinus pressure, diarrhea, cold symptoms, musculoskeletal pain, fatigue, and malaise. At each appointment, his exam is benign except for findings under his control, such as abdominal tenderness or inability to Valsalva vs. not attempting to Valsalva. Today you see that he is one of several patients here for diarrhea. You decide that you are going to address the issue more thoroughly today.

1. Given his history, what do you believe to be the diagnosis?

- A. Depression.
- B. Metabolic syndrome.
- C. Hypothyroidism.
- D. Malingering.
- E. Fear of flying.

ANSWER/DISCUSSION

1. D. The most compelling diagnosis here is malingering. The patient does not present with a constellation of symptoms that is consistent with any particular clinical diagnosis. On the other hand, he does have a history of decreased motivation within his squadron. Potential secondary gains are losing flying status or gaining fitness exemptions, which have both been granted. The other options are not unreasonable: the collateral history from his squadron just makes them less likely. Still, since malingering is a diagnosis of exclusion, you investigate the other listed options.

Clinical depression might present with somatic symptoms, but he has not reported any difficulties with any environment outside his job.^{6,7} Of course, we have no collateral history to describe how engaged he is in other environments, so a mood disorder is worth exploring. You ask your aeromedical technician to administer the Patient Health Questionnaire-9.⁸ One could also consider physical manifestations of

stress due to the high operations tempo and lethality of a gunship squadron.

Although not common among flyers, a flight surgeon needs to consider metabolic syndrome as a possible diagnosis. Metabolic syndrome does correlate with steatosis⁹ and hyperuricemia,² so his diarrhea and musculoskeletal pain could be related to those issues. A review of his physical fitness testing history confirms that his waist circumference does not meet the Adult Treatment Panel III criterion of 40" for diagnosis. He can still meet diagnostic criteria, though, if he has three of the following four findings: elevated triglycerides, decreased high-density lipoprotein, elevated systolic or diastolic blood pressure, less than required for a hypertension waiver, or an elevated fasting glucose.⁴ You order lipids and a fasting glucose.

Thyroid dysfunction often presents as a constellation of seemingly unrelated symptoms. In this particular case, the pattern is not consistent with either hypothyroidism or hyperthyroidism. His fatigue and body habitus are consistent with low thyroid hormone, while the diarrhea is more often associated with elevated thyroid hormone levels. You decide to measure his thyroid-stimulating hormone (TSH).

Regarding fear of flight, this patient has already gone through all of his flying training. It is possible that he could somatize symptoms, but unlikely given his previous history of flying without concern. Still, it is possible that he has recently had an event to increase his trepidation toward flying. You can ascertain this by directly asking him and confirming with his squadron.

You conduct your interview and exam, find nothing remarkable, and place him on 24-h quarters for his presumed viral gastroenteritis. Later that day, you get his lab results back. His only abnormality is an elevated TSH at $124 \text{ mIU} \cdot \text{L}^{-1}$.

2. Given the results of his TSH, what is the most likely diagnosis?

- A. Hypothyroidism.
- B. Hyperthyroidism.
- C. Did you see A?
- D. Come on! $124 \text{ mIU} \cdot \text{L}^{-1}$.
- E. It's not malingering any more.

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ANSWER/DISCUSSION

2. A. You call the flight engineer to schedule a follow-up appointment. He comes back the next day and you discuss his diagnosis of hypothyroidism. You order a free thyroxine and thyroid antibodies, refer him to Endocrinology, and start him on a daily dose of 75 mcg of levothyroxine. His antithyroperoxidase (anti-TPO) comes back positive. Over the next few weeks, you continue to manipulate his medication dosage and his TSH levels normalize. His endocrinologist performs a fine needle aspiration and confirms a diagnosis of Hashimoto's thyroiditis.

Hashimoto's thyroiditis is an autoimmune thyroid disease. Patients have antithyroglobulin and anti-TPO antibodies. While the B-cell immune response can play a role in thyroid cell death, the bulk of the damage comes from T-cell activity, which leads to cytokine-mediated apoptosis. As the thyroid cells succumb to the immune system attacks, the patient is less and less able to maintain an adequate supply of thyroid hormone. Therefore, Hashimoto patients show slowed metabolic activity and the lack of hormonal feedback leads to an elevated TSH.

The U.S. Air Force (USAF) does not currently screen for Hashimoto's thyroiditis. In the National Health and Nutrition Examination Survey, the prevalence of overt Hashimoto's was only 0.3% and subclinical hypothyroidism accounted for only 4.3%.⁵ At least one more recent study has shown rates of clinically significant Hashimoto's as high as 6%, but also revealed a subclinical or euthyroid rate of 7.4%.¹³ If the USAF was to start screening for autoimmune thyroid disease, anti-TPO would be more likely to find people without clinically significant disease than with disease. There are little data to suggest how long it takes for a person with anti-TPO antibodies to convert from euthyroid to clinically significant thyroid disease, and it is unknown whether the conversion is a necessary end point. One longitudinal study revealed that even for women with a TSH greater than $4 \text{ mIU} \cdot \text{L}^{-1}$ at the beginning of the study, only 75% went on to develop overt hypothyroid disease within 13 yr.¹⁵

You wonder why this particular patient's diagnosis was not clear to you and your colleagues earlier. There are many reasons. First, the patient is what you, your colleagues, and presumably many other doctors would deem "difficult." The patient has been a high utilizer of resources for seemingly low acuity cases. He had an apparent secondary gain. In the very busy day-to-day world of preparing Air Commandos for around-the-clock and around-the-world missions, it is easy to trivialize his complaints.

Second, his constellation of symptoms did not point directly to hypothyroidism. In fact, weight gain and fatigue were his only traditional symptoms.¹² His complaints of diarrhea are more indicative of hyperthyroidism, if anything. Many of his visits were consistent with viral infections like upper respiratory infections and acute gastroenteritis that were going around the base. His musculoskeletal complaints could have been the result of a combination of weight gain and the stressors of frequently flying in an older C-130. On top of that, hypothyroidism has many unique presentations. One endocrinologist described patients who presented with hallucinations, paranoia, ileus, weakness with loss of balance, and sudden loss of consciousness.¹⁶ In all of those cases, multiple evaluations and interventions, including a tracheostomy in one case, were conducted before a TSH was measured. In all of the cases, the symptoms resolved with appropriate

thyroid hormone supplementation. In many of those cases, as in this case, other conditions existed that distracted from a more expeditious diagnosis of hypothyroidism.

Another reason not frequently discussed in medicine is that physicians are much more confident in their ability to make diagnoses than their accuracy warrants. A recent study out of Baylor College of Medicine revealed that when presented with easy cases and difficult cases, the physicians were both less confident and accurate in their diagnoses for the harder cases.¹⁰ What is important to note is that the physicians' levels of confidence only dropped marginally while the diagnostic accuracies dropped by an order of magnitude from 55% correct in the easy cases to 6% in the difficult cases. The physicians who participated in the study were all residency trained internists. One might imagine a general medical officer flight surgeon with even higher confidence and lower accuracy for an unclear case like this one.

Finally, this particular patient still may have been pursuing secondary gain in spite of a legitimate diagnosis. Even at supratherapeutic doses, he gained weight and complained that he had no energy to resume exercise. He requested a full exemption from his physical fitness test. A combination of poor work performance and physical fitness test failures led to an administrative separation from the Air Force. Westphal noted that all of his atypical patients improved drastically with appropriate treatment.¹⁶ This patient showed some symptomatic improvement, but his hyperthyroid weight gain and persistent lack of motivation could suggest that he wanted out of his job.

3. What is the most important lesson from this patient?

- A. Airmen should have to pay for sick call visits.
- B. Levothyroxine is not a treatment of choice for hypothyroidism.
- C. Fitness standards guarantee a fit force.
- D. All patients are highly motivated to get better.
- E. Difficult patients can be truly sick.

ANSWER/DISCUSSION

3. E. All physicians have patients they suspect are using the medical system for secondary gain. It is important to realize that those patients might still require your expertise and care. Before dismissing any patient for any reason, consider other explanations for the patient's behavior or odd presentation. Consult a colleague. Check your resources. Get frustrated and order a TSH. Remember the old adage: it is never the thyroid, unless it's the thyroid. Just make sure you always give your difficult patients the benefit of the doubt.

AEROMEDICAL DISPOSITION

In the USAF, hypothyroidism is disqualifying for a flight engineer per the Medical Standards Directory.* The condition can be waived, though. Had this member remained in the USAF, he would have had to demonstrate that he had no symptoms and a stable TSH on

* U.S. Air Force, Section M: endocrinology and metabolic USAF medical standards, M16. In: Medical standards directory. 2016:49. [Accessed 1 May 2016]. Available from [https://kx2.afms.mil/kj/kx4/FlightMedicine/Documents/Medical%20Standards%20Directory%20\(MSD\)/MSD%20Feb%202016%20\(final\).pdf](https://kx2.afms.mil/kj/kx4/FlightMedicine/Documents/Medical%20Standards%20Directory%20(MSD)/MSD%20Feb%202016%20(final).pdf) to those with access.

treatment. Ninety percent of waiver requests for hypothyroidism were approved. Of those who were rejected, nearly all were rejected for other conditions not related to thyroid disease. For patients with subclinical hypothyroidism, a waiver is still required, but the patient does not require any treatment.¹ The U.S. Navy and U.S. Army similarly are willing to waive the diagnosis of hypothyroidism with documentation of a sufficient treatment and stable dose of levothyroxine.^{11,14} The Navy also requires a waiver for subclinical hypothyroidism (TSH = 4.5–10 mIU/L) after 4–6 symptom-free weeks.¹¹ The Federal Aviation Administration includes hypothyroidism as a condition for which Aviation Medical Examiners can reissue an airman medical certificate under the provisions of an Authorization for Special Issuance of a Medical Certificate. Assuming the airman meets all requirements, the Aviation Medical Examiner can issue the certificate during the exam. All other cases must be referred back to the Aerospace Medical Certification Division or Regional Flight Surgeon.³

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REFERENCES

1. Albrecht A, Van Syoc D. Hypothyroidism (Jan 14). In: Air Force waiver guide. Wright-Patterson AFB (OH): U.S. Air Force School of Aerospace Medicine; 2016:470–474. [Accessed 1 May 2016], Available from <http://www.wpafb.af.mil/afrl/711hpw/USAFSAM/>.
2. Choi HK, Ford ES. Prevalence of the metabolic syndrome in individuals with hyperuricemia. *Am J Med.* 2007; 120(5):442–447.
3. Federal Aviation Administration. Special issuances: AME assisted - all classes - hypothyroidism. In: Guide for aviation medical examiners. Washington (DC): Federal Aviation Administration; 2015. [Accessed 18 Sep. 2015]. Available from https://www.faa.gov/about/office_org/headquarters_offices/avs/offices/aam/ame/guide/special_iss/all_classes/hypothyroidism/.
4. Grundy SM, Cleeman JJ, Daniels SR, Donato KA, Eckel RH, et al. Diagnosis and management of the metabolic syndrome: an American Heart Association/National Heart, Lung, and Blood Institute Scientific Statement. *Circulation.* 2005; 112(17):2735–2752.
5. Hollowell JG, Staehling NW, Flanders WD, Hannon WH, Gunter EW, et al. Serum TSH, T(4), and thyroid antibodies in the United States population (1988 to 1994): National Health and Nutrition Examination Survey (NHANES III). *J Clin Endocrinol Metab.* 2002; 87(2):489–499.
6. Kapfhammer HP. Somatic symptoms in depression. *Dialogues Clin Neurosci.* 2006; 8(2):227–239.
7. Kroenke K, Rosmalen JG. Symptoms, syndromes, and the value of psychiatric diagnostics in patients who have functional somatic disorders. *Med Clin North Am.* 2006; 90(4):603–626.
8. Kroenke K, Spitzer RL, Williams JB, Löwe B. The Patient Health Questionnaire Somatic, Anxiety, and Depressive Symptom Scales: a systematic review. *Gen Hosp Psychiatry.* 2010; 32(4):345–359.
9. Marceau P, Biron S, Hould FS, Marceau S, Simard S, et al. Liver pathology and the metabolic syndrome X in severe obesity. *J Clin Endocrinol Metab.* 1999; 84(5):1513–1517.
10. Meyer AN, Payne VL, Meeks DW, Rao R, Singh H. Physicians' diagnostic accuracy, confidence, and resource requests: a vignette study. *JAMA Intern Med.* 2013; 173(21):1952–1958.
11. Naval Aerospace Medical Institute. 5.4 Hypothyroidism. In: U.S. Navy aeromedical reference and waiver guide. Pensacola (FL): Naval Aerospace Medical Institute; 2016. [Accessed 1 Mar. 2016]. Available from <http://www.med.navy.mil/sites/nmmtc/nami/arwg/Pages/AeromedicalReferenceandWaiverGuide.aspx>.
12. Roberts CG, Ladenson PW. Hypothyroidism. *Lancet.* 2004; 363(9411):793–803.
13. Staii A, Mirocha S, Todorova-Koteva K, Glinberg S, Jaume JC. Hashimoto thyroiditis is more frequent than expected when diagnosed by cytology which uncovers a pre-clinical state. *Thyroid Res.* 2010; 3(1):11.
14. U.S. Army Aeromedical Activity. Hypothyroidism (ICD9 244). In: Flight surgeon's aeromedical checklists. Ft. Rucker (AL): U.S. Army Aeromedical Activity; 2014. [Accessed 18 Sep. 2015]. Available from http://glwach.amedd.army.mil/victoryclinic/documents/Army_APLs_28may2014.pdf.
15. Walsh JP, Bremner AP, Feddema P, Leedman PJ, Brown SJ, O'Leary P. Thyrotropin and thyroid antibodies as predictors of hypothyroidism: a 13-year, longitudinal study of a community-based cohort using current immunoassay techniques. *J Clin Endocrinol Metab.* 2010; 95(3):1095–1104.
16. Westphal SA. Unusual presentations of hypothyroidism. *Am J Med Sci.* 1997; 314(5):333–337.

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You are a flight surgeon at an Air Mobility Command base. As you step off the C-17 one night at 22:00 after a 4-h training sortie following a full clinic day, you notice a senior loadmaster limping. Despite your fatigue and an 07:00 clinic tomorrow morning, you take a moment to trudge over and chat, then ask the loadmaster to come see you in clinic the next day. After the appropriate crew rest, this 40-yr-old male loadmaster is in your office describing atraumatic leg pain of 3 mo duration. It came on rather gradually and is not really limiting his activity. He has used no over-the-counter med-

ications. He also admits a 20+ yr history of smoking a pack and a half per day, but otherwise has an unremarkable past medical history and social history. A review of systems reveals that he has no fatigue, fever, or weight loss. He has no abdominal pain or bowel complaints.

On examination you note normal head, ears, eyes, nose, throat, heart, lung, and abdominal exams, a slightly antalgic gait, bilateral

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