Ask Mayo Expert: Anemia Workup in 1919

To the Editor: In 1919, death from pernicious anemia was common, with 0.5% to 1% of deaths attributable to the disease. Establishing this diagnosis without modern laboratory testing was challenging. Disseminating Mayo Clinic’s knowledge relied on textbooks and could not easily keep pace with rapidly evolving medical knowledge.

In that year, the leading Mayo Clinic expert in the diagnostic workup of anemia was Dr Arthur Hawley Sanford (Figure), who became the director of the clinical laboratories in 1911. In a concise review presented to the Medical Society of the State of New York in 1919, and published via textbook, he outlined Mayo Clinic’s state-of-the-art anemia workup.

Dr Sanford began his workup noninvasively. A funduscopic examination of the “eye grounds” was performed. Blood was drawn for a series of tests including a manual blood count, observation of the sedimentation rate, and measurement of the average red blood cell volume. The Wassermann reaction, in which cardiopin is mixed with blood, was performed to detect perforation. Interpreting the testing was difficult, but the amount of hydrochloric acid present and its neutralization following this standardized meal was theorized to show the patient’s susceptibility to ulcers.

Following the Ewald test, the nasogastric tube would be advanced to evaluate the duodenal contents. A new method, referred to as Schneider’s method, used spectroscopic analysis of urobilin and urobilinogen content to determine if the duodenal secretion contained urobilinogen. In chronic anemia, the patient would have a normal value of urobilinogen, but in a patient with an elevated urobilinogen, it would be indicative of pernicious anemia.

Contrast Dr Sanford’s state-of-the-art workup in 1919 to the similar patient with pernicious anemia presenting in 2019. When physicians have clinical questions they could have AskMayoExpert, developed by a team of Mayo Clinic hematologists and internists accessed in a click and be advised to perform the following workup.

A complete blood count would be obtained through an automatic Coulter Counter. The anemia would then be classified as macrocytic based on an elevated mean corpuscular volume (MCV). After classifying the anemia based on MCV, a serum homocysteine, folate, reticulocyte count, and a pernicious anemia cascade would be ordered. The pernicious anemia cascade reflexively checks methylmalonic acid (MMA), gastrin, and intrinsic factor antibodies if the B12 level is low or borderline. The labs would likely result in an elevated MMA and positive anti-intrinsic factor antibodies.

A century separates these diagnostic workups. Whether by 20th-century textbook or by 21st-century Internet, the dissemination of knowledge by Mayo Clinic is key to its mission.

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Embodied Spinal Dural AV Fistula Repairs
Syringomyelia and Polyradiculopathy

To The Editor: A 68-year-old man presented with 3 years of progressive painful lower extremity weakness. He had urinary retention.