Clinical Digest

Rheumatology

Painful Forecasts

When your patient claims that his arthritic knee can predict the weather, is he right? For years, investigations into possible connections between rheumatic pain and weather conditions have failed to reach a consensus.

To clear up the confusion, researchers from Tufts-New England Medical Center, Boston, MA collected three months worth of pain reports from 200 patients with knee osteoarthritis located across the United States. They compared these reports with weather data—including daily temperatures, barometric pressure, dew point, precipitation, and relative humidity—from the weather station closest to each patient.

The analysis showed that barometric pressure increases and colder ambient temperatures were linked consistently to greater pain. This association remained strong even after the researchers adjusted for age, gender, body mass index, nonsteroidal anti-inflammatory drug use, opioid use, and prior pain score.

The researchers note that their study was designed to reduce or eliminate many of the biases that hampered previous studies. Specifically, they say, the participants' geographical diversity allowed for greater variability in weather exposure, and the policy of keeping the study hypothesis from participants during the trial minimized its potential influence on results.

The researchers cite a few possible explanations for weather's apparent effects on rheumatic pain. Regarding barometric pressure, increases in tissue gas tension surrounding the joints may interfere with joint lubrication—an explanation that also has been proposed for joint pain experienced by divers during compression. Temperature could have direct effects on the compliance of periarticular structures and the viscosity of synovial fluid, as well as indirect effects on inflammatory mediators through its influence on capillary permeability.

Source: *Am J Med.* 2007;120(5):429–434. doi:10.1016/j.amjmed.2006.07.036.

Infection Control

Do Antimicrobial Covers Really Protect Stethoscopes?

Antimicrobial diaphragm covers may be worse than just ineffectual in protecting stethoscopes from bacterial contamination—they might even help to promote it. That was the conclusion of researchers from Saint Alphonsus Regional Medical Center, Boise, ID, who cultured the stethoscopes of 74 clinicians.

Before the study, stethoscope diaphragm covers impregnated with silver ions were distributed to a mixed group of clinicians working in a large intensive care unit and a regional trauma emergency department. Later, the researchers randomly selected equal numbers of clinicians who did or did not have the antimicrobial covers and cultured their stethoscope diaphragms. The researchers also asked the clinicians whether they were using an antimicrobial cover, whether they were using it beyond the manufacturer's recommended time frame (one week), how often they cleaned their stethoscopes, and what cleaning agent they used.

Regardless of whether or not antimicrobial covers were used, every one of the stethoscopes was contaminated. The percentage of higher colony counts (over 200) was significantly greater, however, for the stethoscopes on which antimicrobial covers had been used (62.1%) compared with the other stethoscopes (8.1%).

The researchers speculate that the covers' added surface area and embossed lettering actually may shield microbes from cleaning agents; many of the cultures from the covered stethoscopes had colonies in the shape of the embossing. It's also possible that the use of covers encourages clinicians to clean their stethoscopes less frequently—though this study found no independent relationship between the method or frequency of cleaning and the colony count. Even accounting for the study's weaknesses, the researchers say, the results seriously question the utility of the antimicrobial covers.

Source: *Am J Infect Control.* 2007;35(4):263–266. doi:10.1016/j.ajic.2006.09.004.

Cardiovascular Disease

Depression, Stress, and Metabolic Syndrome

Accumulating evidence suggests that negative emotions and stress may inflict more than just psychological harm. Now, results from the Healthy Women Study (HWS), a long-term, prospective cohort study, link these psychosocial factors to the development of metabolic syndrome—defined through multiple criteria—in a population of healthy, middle-aged women.

In this study, 541 premenopausal women underwent a detailed clinical examination, which included several validated psychosocial scales, in the early 1980s. The examination was

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repeated about three years later, after 12 successive months with no menstruation, and at approximate three-year intervals for up to 17 years postmenopause.

Starting at the first three-year follow-up, the examinations included sufficient components to assess participants for metabolic syndrome according to criteria established by the World Health Organization (WHO), the National Cholesterol Education Program Adult Treatment Panel III (ATP III), and the International Diabetes Foundation (IDF). The researchers analyzed data from the 432 participants who had all relevant components measured at this examination and at least one subsequent examination. These participants had each of the metabolic syndrome components measured an average of 5.3 times over an average of 15 years.

Among participants without metabolic syndrome at the starting examination, depressive symptoms were correlated with a 1.21- to 1.43-fold increased risk of developing the syndrome—using each of the three sets of criteria—over time. A very stressful life event in the past six months increased the risk 2.12-fold using the WHO criteria and 1.49-fold using the ATP III criteria. Finally, global perceived stress predicted the development of the WHO criteria, and intense and frequent feelings of anger predicted development of the ATP III and the IDF criteria. After controlling for age, educational level, use of hormone replacement therapy, and health behaviors, all associations remained significant except that between depressive symptoms and the WHO criteria and those involving the IDF criteria.

The researchers suggest several possible mechanisms for the observed links, including the effects of psychosocial factors on the hypothalamic-pituitary-adrenocortical system, autonomic nervous system, and hemostatic and inflammatory markers; the blunting of serotonin release that may result from depression and other negative emotions; genetic factors; and shared prenatal origins.

Source: *Diabetes Care.* 2007;30(4):872–877. doi:10.2337/dc06-1857.

PATIENT SAFETY

Reducing Diagnostic Blood Loss

Since the early 1970s, many studies have suggested that frequent diagnostic phlebotomy can result in significant blood loss for patients. Despite the adoption of blood conservation measures in some hospitals, a nurse researcher from Reston Hospital Center, Reston, VA says this problem has not been solved.

She reviewed the computerized records of 43 critically ill patients who were mechanically ventilated for at least 24 hours at a small community hospital. This hospital's blood conservation efforts included the use of small-volume specimen tubes, point-of-care testing, and reservoir systems.

Study patients had a mean volume of 16 mL of blood withdrawn daily and 245 mL withdrawn per hospitalization. The patients who were hospitalized the longest had the most blood withdrawn, with withdrawals exceeding 500 mL for each of the four patients hospitalized for 36 to 65 days. Blood chemistry studies were the most frequently performed tests—together with hematology studies, they accounted for more than half of the blood volume withdrawn.

According to the researcher, the patients' mean daily blood loss was "much lower" than those of similar patients in other studies, which may be due in part to the hospital's blood conservation efforts. She also notes that physicians' favoring of noninvasive methods for monitoring arterial blood gas may have contributed to substantially fewer withdrawals for this purpose compared to previous studies. Nevertheless, she says some of the patients—especially those with long hospitalizations—remained at risk for significant blood loss.

To minimize diagnostic blood loss, the researcher recommends reviewing prescriptions routinely to look for redundant or unjustified tests, stopping prescriptions for repeated tests automatically if they are not renewed after a set time, adjusting test schedules to "batch" tests, following blood sample procedures closely to reduce sample discarding, and posting a running total of blood volume withdrawn on patients' charts.

Source: *Heart Lung.* 2007;36(3):217–222. doi:10.1016/j.hrtlng.2006.09.001.

DIABETES MANAGEMENT

HbA_{1c} and PAD

The higher the hemoglobin A_{1c} (HbA_{1c}) level in a patient with diabetes and peripheral arterial disease (PAD), the more likely it is that PAD will be severe, say researchers from New York Medical College, Valhalla, NY and University of Texas, Houston. They came to this conclusion after studying 224 patients—145 men and 79 women, with a mean age of 70 years—who had diabetes and PAD.

The researchers say their study may be the first to describe this association, although a higher HbA_{1c} level has been linked generally to PAD. While current guidelines recommend keeping levels below 7% in patients with diabetes and PAD, the researchers advise that these patients "undergo intensive risk factor modification," with an HbA_{1c} target of less than 6.5%.

Source: *Am J Cardiol.* 2007;99(10):1468–1469. doi:10.1016/j.amjcard.2006.12.085.