

DIABETES CARE

Fingerstick Infection from Glucose Monitoring

Although rare, infection (due to bacterial, viral, and fungal pathogens) can occur with blood glucose monitoring. In a recently published report, researchers from The University Hospital, Newark, New Jersey, and State University of New York and Long Island University, both in Brooklyn, New York, documented the first case of *Pseudomonas aeruginosa* bacteremia introduced during a patient's routine blood glucose fingerstick. They note that 2 cases of bacterial sepsis of the finger have been described previously as a complication of home blood glucose self-monitoring. Both of those patients had poorly controlled diabetes and repeatedly reused disposable needles.

The patient, a 50-year-old woman with diabetes mellitus, hypertension, and asthma, was admitted to the hospital for thrombocytopenia requiring transfusion. Two months prior to her admission, acute myelogenous leukemia was diagnosed and she received induction chemotherapy with daunorubicin and cytarabine. During this treatment, febrile neutropenia developed. No source of infection was identified, and she was discharged after being hospitalized for 1 month.

During the patient's case presentation to the hospital she was found to be pancytopenic. She was afebrile, however, and she reported no new symptoms and no abnormal findings were found upon physical examination. She was admitted and once-daily treatment with pegfilgrastim 300 µg IM was initiated. She also was trans-



fused (to maintain her hemoglobin level above 8 g/dL and her platelet count above 20,000 cells/mm³). Her blood glucose levels were monitored 4 times daily.

On the patient's third day of admission, she reported pain in the finger where the last fingerstick had been done. Upon examination, the left middle finger appeared swollen and tender. The patient was febrile and had an absolute neutrophil count of 84 cells/mm³. Although treatment was started for the infection, overnight, she went from the beginning of infection to hypotension requiring vasopressors and was transferred to the Medical Intensive Care Unit.

After she was stabilized and transferred back to the general medical unit, *P aeruginosa* was isolated from the blood culture that had been performed when she first reported pain in her finger. Despite documented resolution of the bacteremia, she remained febrile, with the wound on her fin-

gertip progressing into an abscess. Swelling of the hand and arm, blistering on the dorsum of the hand, and a palpable venous cord in the upper arm also occurred.

The patient underwent incision and drainage of the abscess and received more antibiotic therapy. She continued to have pain and tenderness in the left hand, however, and by the third week of her hospital course, a gangrenous ulcer had developed. Amputation of the finger was decided on due to the high likelihood for acute osteomyelitis of the left middle finger and the lack of clinical improvement with targeted antibiotic therapy.

The authors believe the key to the patient's infection may have been her neutropenic state. They note that patients with neutropenia and immunosuppression are particularly vulnerable to ecthyma gangrenosum, which, while rare, is associated with *P aeruginosa* septicemia. It develops from hematogenous seeding of the

pathogen in the small vessels, leading to vasculitis and necrosis.

While contaminated equipment is a potential mode of transmission (as are insulin vials and exposure via medical procedures), the authors say that, given the site of infection and timing of clinical signs and symptoms, the fingerstick device was most likely the source of the infection in this case. They note that the benefits of routine blood glucose monitoring usually outweigh the potential risks related to fingersticks and other diabetes-care procedures, although this case highlights the need for increased awareness and strict adherence to infection control practices to prevent the transmission of bloodborne pathogens.

Source: *J Infect.* 2010;60(5):382–385.
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PULMONARY DISEASE

Taking a Closer Look at Magnetic Resonance Angiography

Magnetic resonance angiography (MRA) may not be the best option for diagnosing pulmonary embolism (PE), say researchers for the Prospective Investigation of Pulmonary Embolism Diagnosis III. In their prospective, multicenter study, the researchers investigated performance characteristics of MRA, with or without magnetic resonance venography (MRV), for diagnosing PE.

Study participants were recruited from April 2006 through September 2008 from 7 different centers. Inclusion parameters were age 18 years or older and hospitalization or emergency department admission with diagnosed or excluded PE. (Diagnosis or exclusion of PE was made according to reference standard tests—such as computed tomographic

angiography and venography, ventilation-perfusion lung scan, venous ultrasonography, D-dimer assay—and clinical assessment.) From 2,273 eligible patients, 818 consented to participate and 371 were assigned randomly to receive MRA. All but 1 of the 371 participants also underwent MRV. The diagnostic reference test was positive for PE for 104 patients and negative for PE for 267 patients.

Using MRA, PE was identified in 59 of the 104 patients (57%) who tested positive for PE on the reference tests. MRA excluded PE in 201 of the 267 patients (75%) who tested negative for PE on the reference tests. These results included MRAs that were technically inadequate, however, say the researchers. In fact, when averaged across the centers, technically inadequate MRA (due to poor arterial opacification, motion artifact, wrap-around artifact, and parallel imaging artifact) occurred in 92 of 371 patients (25%). The rates of MRA inadequacy varied by center, with the proportion of technically inadequate images ranging from 11% to 52%.

When the researchers included only those patients with technically adequate images, MRA had a sensitivity of 78% (59 of 76) and a specificity of 99% (201 of 203). MRA combined with MRV had a sensitivity of 92% and a specificity of 96%, but nearly half (52%) of the patients had technically inadequate imaging results.

The researchers conclude that, since MRA often resulted in technically inadequate images and the rate of technically inadequate images varied considerably among centers, MRA should be considered only at centers that routinely perform it well and only for patients for whom standard tests are contraindicated. When combined, the researchers say, MRA and MRV have a higher sensitivity than MRA alone, although it is more difficult to obtain technically

adequate images with the combined procedures.

Source: *Ann Intern Med.* 2010;152(7):434–443.

NEUROLOGY

Driving After Stroke

How well patients are doing at 3 months poststroke may predict how likely they are to be driving within the year, say researchers from McGill University, Montreal, Quebec, and Queen's University, Kingston, Ontario, both in Canada. The objective of their cohort study was to estimate the extent to which numerous measures important to driving (such as physical strength, motor activity, cognition, fatigue, emotional state, and contextual factors) at 3 months poststroke predict driving resumption at 1 year.

All of the 290 patients included in their study were participants of a previous longitudinal study on stroke outcomes. All had been admitted to the hospital with acute stroke and were driving prior to their stroke. The main outcome measure was driving resumption 1 year after the initial stroke diagnosis (assessed by using the Preference Based Stroke Index, which measures driving through 1 of 4 self-reported responses).

Of the 290 patients, 177 (61%) returned to driving after 1 year. On average, those who began driving again were younger men with a milder stroke (greater than 8.5 on the Canadian Neurological Scale) who had better scores on all subscales of the Medical Outcomes Study 36-Item Short-Form Health Survey (SF-36) and the Stroke Impact Scale (SIS) at 3 months—indicating better health status.

The difference between those patients who resumed driving and those who did not was particularly pronounced, the researchers say, for



measures of strength and motor activity. For example, the mean (SD) score on the SF-36 physical function scale for those who resumed driving was nearly double the mean (SD) score for patients who did not (71 [26] vs 39 [32]). Fatigue influenced strength and motor activity; each 10-point increase on the vitality subscale of the SF-36 increased strength and motor activity by approximately 5 points. Women reported higher levels of fatigue than men.

The severity and type of stroke were not statistically significant factors, although, when compared to patients with ischemic stroke, those with hemorrhagic stroke scored approximately 10 points higher on the strength and motor activity scale. The study revealed a direct effect from type of stroke to driving status in that patients with hemorrhagic stroke were less likely to return to driving.

Cognition had a marked relationship with the ability to resume driving poststroke, as the odds of driving resumption increased by 30% for each 1-point increase on the Mini-Mental State Examination (MMSE). Age also had a direct effect on driving resumption—each decade increase in age

reduced the odds of returning to driving by about 50%.

The researchers modeled the relationships between the factors and driving resumption using “path analysis,” in which independent variables (such as emotion; fatigue; and contextual factors, such as age and sex) can influence one another and, therefore, have an indirect influence on the outcome. The researchers say that path analysis helps clarify the relationships between the domains necessary for driving (a complex activity requiring visual perception, cognition, and physical function). This is an important consideration, they add, since it allows clinicians to identify possible areas for intervention, including strategies to reduce fatigue and help increase strength and motor activity, which, in turn, increase the odds of driving resumption.

The findings also highlight a number of predictors that are not amenable to intervention, the researchers note. An older patient who has had a severe stroke, for example, is unlikely to return to driving. The researchers say that understanding and addressing these issues during rehabilitation “can help patients and their fami-

lies prepare for driving cessation in a proactive manner that focuses on maintaining community mobility.” Future studies that include measures of driving status, such as mileage and driving patterns, along with specific measures of the types of cognitive impairment related to driving, such as processing speed, may help to clarify the potential for returning to driving poststroke.

Source: *Arch Phys Med Rehabil.* 2010;91(6):868–873. doi:10.1016/j.apmr.2010.03.009.

PAIN MANAGEMENT

Using Mood to Control Pain

Results from a recent study suggest that people who perceive themselves as being more capable of managing their moods have a higher capacity to deal with stressful experiences adequately, and may experience less of a continuing impact of pain. In their study, researchers from University of Málaga, Spain, sought to analyze differences in pain perception and mood generated by the cold-pressor test (CPT) experimental paradigm in women with high and low emotional regulation. (Emotional regulation is a process by which people influence the kind of emotions they have, when they have them, how they experience them, and how they express them.)

The researchers studied data from 117 university students with a mean age of 21.54 years. Men were excluded from the analysis due to their low representativeness in the sample, while other study exclusion criteria included having chronic pain, circulatory problems, hypertension, diabetes, or taking an analgesic. The researchers divided the remaining participants into 2 groups of women (24 with high capacity for emotional repair and 28 with low capacity for emotional repair) as a function of

their score on the Emotional Repair subscale of the Trait Meta-Mood Scale (TMMS).

The TMMS assesses how people reflect upon their moods, as well as evaluates the extent to which people attend to and value their feelings, feel clear rather than confused about their feelings, and use positive thinking to repair negative moods. The researchers hypothesized that women with a high ability to regulate their emotions would have a lower level of sensory pain and affective pain during the CPT, as well as a better mood before and during the test.

During the CPT procedure, each participant was asked to place her nondominant hand in a tray of very cold water, keeping it in as long as possible. Periodically throughout the task (every 15 seconds), the researchers asked the participants about the degree of sensory and affective pain they were feeling. Participants were asked to respond on a scale of 0 to 10, where 0 was no pain and 10 was unbearable pain. Prior to the task, participants completed the Positive and Negative Affect Scale (PANAS), and they again completed the PANAS immediately after removing their hands from the water.

The group of women with high emotional repair presented a higher mean time of immersion than the low emotional repair group, although the difference did not reach statistical significance. The group with high emotional repair showed a lower rate of sensory pain and a lower rate of affective pain during the CPT. Women with a higher score in emotional repair also reported a more positive mood before beginning the experiment and during the immersion—thus displaying lower impact of the experience of pain.

The researchers say that “women who perceive themselves as having higher emotional repair deal with the CPT better, are able to reduce its emotional impact, and experience it as less painful.” Based on this, they say, new questions arise regarding what we do when we regulate our moods, what mechanisms we set off when we begin the process of emotional regulation, and which mechanisms that make up the regulation are effective. Further research is needed to answer such questions. In addition, the researchers note that men cope with the presence of a painful experience differently and may have a higher capacity to manage their emotions. As such, other studies

that include male populations and analyze the differences between sexes may be necessary. ●

Source: *J Pain*. 2010;11(6):564–569.
doi:10.1016/j.jpain.2009.09.011.