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# MISSOURI HOSPITALIST

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## Hospitalist Update:

### 10 Things to Know About Influenza

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1. **Introduction:** Influenza is an acute, contagious and usually self-limited febrile illness caused by infection of the respiratory tract with the influenza virus. The most common clinical manifestations are fever, malaise, and cough. The epidemic nature of influenza results in outbreaks every winter (seasonal influenza) but it is important to remember that the potential to become a pandemic always exists, as in the 2009 H1N1 influenza pandemic (this virus was a unique combination of influenza virus genes never previously identified in either animals or people). Influenza viruses spread mainly by direct contact or inhalation of aerosols or large droplets from persons with influenza during a cough, sneeze or talk. Less often, infection is acquired from indirect contact of a person's mouth, eyes or nose with contaminated environmental surfaces (fomites) that contain the viruses. The incubation period is 1-4 days (average: 2 days). The infective period begins 1 day before onset of

symptoms and extends to 5-7 days after becoming sick. Mortality from influenza infection is related mainly to its pulmonary complications.

**2. Know the enemy:** Influenza viruses are RNA viruses that belong to the family Orthomyxoviridae and are classified into three distinct types, influenza A, influenza B, and influenza C virus, on the basis of major antigenic differences. Influenza A viruses are further divided into subtypes on the basis of their hemagglutinin (HA) and neuraminidase (NA) activity (e.g., H1N1 or H3N2). Currently, infections during influenza season are usually caused by influenza types A (2009 H1N1), A (H3N2), and B. A recent CDC health advisory alerted clinicians about a number of reports of severe respiratory illness among young and middle-aged adults, many of whom were infected with influenza A (2009 H1N1) or pH1N1. Multiple pH1N1-associated hospitalizations, including many requiring intensive care unit (ICU) admission, and some fatalities have been reported. The pH1N1 virus that emerged in 2009 caused more illness in children and young adults, compared to older adults, although severe illness was seen in all age groups. While it is not possible to predict which influenza viruses will predominate during the entire 2013-14 season, pH1N1 has been the predominant circulating virus so far. For the 2013-14 season, if pH1N1 virus continue to circulate widely, illness that disproportionately affects young and middle-aged adults may occur. Reports of new subtypes are in the news. For example, human infections with a new avian influenza A (H7N9) virus were first reported in China in March 2013. Most of these infections are believed to result from exposure to infected poultry or contaminated environments. Most patients had a severe respiratory illness, with about one-third resulting in death. No cases of H7N9 outside of China have been reported. Influenza viruses that normally circulate in pigs are called "variant" viruses when they are found in humans. Influenza A H3N2 variant viruses (also known as "H3N2v" viruses) with the matrix (M) gene from the 2009 H1N1 virus were first detected in humans in July 2011. In 2012, 309 cases of H3N2v infection across 12 states were detected. These infections have been mostly associated with prolonged exposure to pigs at agricultural fairs. Another subtype is the highly pathogenic avian influenza (HPAI) A (H5N1) virus. Human infections with this subtype are rare, although sporadic cases have been reported. Indonesia, Vietnam and Egypt have reported the highest number of human HPAI H5N1 cases to date. The mortality rate is 60%. In the majority of cases, the person got HPAI H5N1 virus infection after direct or close contact with sick or dead infected poultry. This is one difference with H7N9, in which the infected poultry may be asymptomatic.

**3. A little history:** Influenza has caused pandemics as a result of antigenic shift (replacement of HA and NA) resulting in "new" viruses to which the population has no immunity. Only influenza A can experience antigenic shift. A pandemic can be devastating. In fact, the most significant infectious disease outbreak known to man was the Spanish Flu of 1918 that caused more than 50 million deaths; 50% of deaths were in people 20-40 years old. Other known influenza pandemics were the Asian Flu of 1957, the Hong Kong Flu of 1968, the Russian Flu of 1977 and the most recent 2009 H1N1 Flu.

**4. Epidemiology:** There are 25-50 million cases per seasonal influenza epidemic, causing more than 200,000 hospitalizations per year, more than 36,000 deaths per year and annual cost of approximately $87 billion. While any person is at risk of getting the infection, those older than 65 years have increased rates of severe illness, hospitalization and death. American Indians, Alaskan Natives, young children and pregnant women are also at increased risk of complications. Other comorbid conditions that predispose to complications are: asthma, neurological disorders (cerebral

palsy, epilepsy, stroke, muscular dystrophy, spinal cord injury), chronic lung disease (COPD, CF), cardiovascular disease (CHF, CAD), hematological disorders (sickle cell disease), diabetes mellitus, kidney disorders, liver disorders, immune deficiencies, BMI >40.

**5. Complications:** Uncomplicated influenza illness typically resolves after 3-7 days in most cases, although cough and malaise can persist for >2 weeks. However, influenza virus infections can cause primary influenza viral pneumonia; exacerbate underlying medical conditions (e.g., pulmonary or cardiac disease); lead to secondary bacterial pneumonia (typically Streptococcus pneumoniae and Staphylococcus aureus), sinusitis, or otitis media; or contribute to coinfections with other viral or bacterial pathogens. Influenza virus infection also has been uncommonly associated with encephalopathy, transverse myelitis, myositis, myocarditis, pericarditis, and Reye syndrome.

**6. Diagnosis:** Influenza illness can include any or all of these symptoms: fever, muscle aches, headache, lack of energy, dry cough, sore throat, and runny nose. However, not everyone with influenza will have a fever. Respiratory illnesses caused by influenza virus infection are difficult to distinguish from illnesses caused by other respiratory pathogens on the basis of signs and symptoms alone. Hence, the differential diagnosis includes, but is not limited to, infections caused by Mycoplasma pneumoniae, Legionella spp., adenoviruses, RSV, rhinovirus, parainfluenza viruses, metapneumovirus. Sensitivity and predictive value of clinical definitions vary, depending on the prevalence of other respiratory pathogens and the level of influenza activity. For example, clinical assessment can have a positive predictive value up to 88% in adults living in areas with confirmed influenza virus circulation. Accurate and timely diagnosis of influenza is important because it can reduce the inappropriate use of antibiotics and provide the option of using early antiviral therapy. Several tests can help in the diagnosis of influenza as seen in the table below.

| Method | Acceptable specimens | Test time |
|---|---|---|
| Viral culture | Nasopharyngeal swab<br>Throat swab<br>Bronchial wash<br>Sputum | 3-10 days |
| | Endotracheal aspirate | |
| Immunofluorescence<br>Direct (DFA) or indirect (IFA) | Nasopharyngeal swab<br>Bronchial wash | 1-4 hours |
| | Endotracheal aspirate | |
| RT-PCR<br>Singleplex or multiplex | Nasopharyngeal swab<br>Throat swab<br>Bronchial wash<br>Sputum | 1-6 hours |
| | Endotracheal aspirate | |
| Rapid influenza diagnostic tests | Nasopharyngeal swab<br>Throat swab | <30 minutes |
| | Nasal wash | |

Influenza testing should be done when results will affect clinical decision making (for example, a hospitalized patient with respiratory symptoms) and ideally within 4 days of onset of symptoms. The most commonly used testing method is the rapid antigen test, which provides results within 30 minutes and is 50-70% sensitive when compared with viral culture or PCR. It is important to remember that false positives occur when prevalence is low (beginning/end of influenza season) and false negatives occur when prevalence is high. It is 90-95% specific. In other words, the rapid tests are useful for confirming infection with influenza but not for ruling out infection. If the rapid test is negative and clinical suspicion persists and a positive testing would change management, a molecular test such as the multiplex RT-PCR (commonly called "respiratory viral panel") can be sent, which is more sensitive and has the advantage of testing for other respiratory viruses and bacteria (Influenza A, Influenza A Subtypes H1, H1-2009, & H3, Influenza B, Parainfluenza Types 1, 2, 3, Respiratory Syncytial Virus, Human Metapneumovirus, Rhinovirus, Adenovirus, Bordetella pertussis, Chlamydophila pneumoniae, Mycoplasma pneumoniae, Coronavirus 229E, Coronavirus OC43, Coronavirus HKU1, and Coronavirus NL63). This is probably the preferred test in severely immunocompromised patients (e.g., stem cell transplant recipients) or critically ill patients with an unexplained respiratory illness.

**7. Treatment:** Four antiviral drugs are available for treatment of influenza: M2 inhibitors (amantadine and rimantadine) and neuraminidase inhibitors (zanamivir and oseltamivir). The M2 inhibitors are active against influenza A only. Widespread M2 inhibitor resistance among influenza A (H3N2) virus strains has made this class less useful clinically. In addition, circulating 2009 H1N1 virus strains are resistant to M2 inhibitors. The neuraminidase inhibitors are active against influenza A and B. For the reasons above, only oseltamivir and zanamivir are currently recommended for use during the influenza season. Studies have shown that neuraminidase inhibitors reduce duration of symptoms by 1-1.5 days when administered within 2 days of illness onset. They also reduced risk of complications (pneumonia, hospitalization, respiratory failure, death). Antiviral therapy is indicated in any patient with influenza who: is hospitalized; has severe, complicated, or progressive illness; or is at higher risk for influenza complications (see Epidemiology). Although the greatest benefit is achieved when antiviral is started within 48 hours of illness onset, antiviral treatment might still be beneficial in patients with severe, complicated, or progressive illness and in hospitalized patient when administered >48 hours from illness onset. Decisions about starting antiviral treatment should not wait for laboratory confirmation of influenza. Antiviral treatment also can be considered for any previously healthy, symptomatic outpatient not at high risk with confirmed or suspected influenza on the basis of clinical judgment, if treatment can be initiated within 48 hours of illness onset.

**8. Postexposure prophylaxis:** In randomized, placebo-controlled trials, both oseltamivir and zanamivir were efficacious in the prevention of influenza illness among persons who were administered chemoprophylaxis after a household member or other close contact had laboratory-confirmed influenza. Postexposure chemoprophylaxis with neuraminidase inhibitors generally should be reserved for those who have had recent close contact with a person with influenza. Antiviral chemoprophylaxis can be considered in family or close contacts of a person with a suspected or confirmed case if they are at higher risk for influenza complications and have not been vaccinated against influenza at the time of exposure. Persons who receive an antiviral medication for chemoprophylaxis might still acquire influenza virus infection and be potentially able to transmit influenza virus, even if clinical illness is prevented. Decisions on whether to administer antivirals for chemoprophylaxis should take into account the exposed person's risk for influenza complications, the type and duration of contact, recommendations from local or public health authorities, and clinical judgment. Generally,

postexposure chemoprophylaxis for persons should be only used when antivirals can be started within 48 hours of the most recent exposure and is typically administered for a total of no more than 10 days after the most recent known exposure to a close contact known to have influenza. Chemoprophylaxis with antiviral medications is not a substitute for influenza vaccination when influenza vaccine is available (see below).

**9. Influenza vaccination:** According to the Advisory Committee on Immunization Practices (ACIP) for 2013-2014, routine annual influenza vaccination of all persons aged 6 months and older continues to be recommended. 2013-14 U.S. trivalent influenza vaccines contain an A/ California/7/2009 (H1N1)-like virus, an H3N2 virus antigenically like the cell-propagated prototype virus A/Victoria/361/2011, and a B/Massachusetts/2/2012-like virus (Yamagata lineage). Quadrivalent vaccines will include an additional vaccine virus, a B/Brisbane/60/2008-like virus (Victoria lineage). There are several vaccine products currently available in 5 categories:

a. Inactivated Influenza Vaccine, Trivalent (IIV3), Standard Dose
b. Inactivated Influenza Vaccine, Trivalent (IIV3), High Dose
c. Inactivated Influenza Vaccine, Quadrivalent (IIV4), Standard Dose
d. Recombinant Influenza Vaccine, Trivalent (RIV3)
e. Live-attenuated Influenza Vaccine, Quadrivalent (LAIV4)

Please visit the Centers for Disease Control and Prevention (CDC) website for the complete list of vaccine products (www.cdc.gov). Other considerations: the IIV3 High Dose is recommended for people 65 years of age and older; it contains 4 times the dose of antigen compared to the standard dose for a better immunogenic response (studies showed 24.2% more effectiveness in this population). The RIV3 is egg-free and can be used in people with history of severe allergic reactions to eggs, if aged 18-49 years. If the reaction is only hives, administer IIV and observe for reaction for at least 30 minutes. Women who are or will be pregnant during influenza season should receive IIV. Pregnant and postpartum women do not need to avoid contact with persons recently vaccinated with LAIV. Administration of IIV to persons receiving influenza antiviral drugs for treatment or chemoprophylaxis is acceptable. Inactivated vaccines do not interfere with the immune response to other inactivated vaccines or to live vaccines.

**10. Resources:** The CDC website has a robust influenza section with information for health professionals. I recommend checking regularly FluView, a weekly influenza surveillance report and case counts per region. You can also visit the Missouri Department of Health & Senior Services for weekly influenza reports in the state of Missouri. It provides information by county and comparisons with previous years. See the hyperlinks below.

**Useful References:**


- Centers for Disease Control and Prevention (CDC) website: www.cdc.gov/flu/professionals
- FluView: www.cdc.gov/flu/weekly
- Prevention and Control of Seasonal Influenza with Vaccines: Recommendations of the ACIP — United States, 2013–2014. MMWR; September 20, 2013 / 62(RR07);1-43.
- MMWR: Evaluation of 11 Commercially Available Rapid Influenza Diagnostic Tests — United States, 2011–2012, November 2, 2012. MMWR; November 2, 2012 / 61(43);873-876.

- Antiviral Agents for the Treatment and Chemoprophylaxis of Influenza - Recommendations of the Advisory Committee on Immunization Practices (ACIP). MMWR; January 21, 2011/60 (RR01);1-24.
- www.health.mo.gov/living/healthcondiseases/communicable/influenza/reports.php
- Treanor, J. Influenza viruses, including avian influenza and swine influenza. In: Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases. 7th edition. Philadelphia: Chnurchill Livingston Elsevier. 2010.


# HEMATOLOGY UPDATE


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ASH Choosing Wisely®:

After attending the American Society of Hematology (ASH) meeting a few weeks ago, it is time to discuss the Choosing Wisely campaign®. This is a quality improvement project led by the American Board of Internal Medicine (ABIM) Foundation in collaboration with the leading national medical professional societies. This campaign aims to encourage open discussion among patients, physicians and the community regarding the costs and benefits of medical care, taking into account the increasing health care costs.

The Choosing Wisely® campaign challenges medical societies to identify 5 tests, procedures, or treatments within each specialty's clinical domain that are offered to patients despite an absence of evidence demonstrating benefit or, in some cases, despite evidence demonstrating disutility or harm.

ASH has identified 5 tests/intervention practices that can be improved and provided these recommendation so the care provider teams actually consider the anticipated benefits of these interventions before choosing to perform them.

ASH Choosing Wisely® Recommendations:

1. In situations where transfusion of RBCs is necessary, transfuse the minimum number of units required to relieve symptoms of anemia or to return the patient to a safe hemoglobin range (7-8 g/dL in stable, non-cardiac in-patients)
2. Do not test for thrombophilia in adult patients with venous thromboembolism occurring in the setting of major transient risk factors (surgery, trauma, or prolonged immobility)
3. Do not use inferior vena cava filters routinely in patients with acute venous thromboembolism
4. Do not administer plasma or prothrombin complex concentrates for non-emergent reversal of vitamin K antagonists (i.e., outside of the setting of major bleeding, intracranial hemorrhage, or anticipated emergent surgery)

5. Limit surveillance CT scans in asymptomatic patients after curative-intent treatment for aggressive lymphoma
6. Do not diagnose or initiate treatment of lymphoma on the basis of tissue obtained exclusively with fine needle aspiration

Please find this article in ASH Education book—Dec 2013—Blood:
**The ASH Choosing Wisely® campaign: five hematologic tests and treatments to question**
*Lisa K. Hicks, Harriet Bering, Kenneth R. Carson, Judith Kleinerman,Vishal Kukreti, Alice Ma, Brigitta U. Mueller, Sarah H. O'Brien, Marcelo Pasquini, Ravindra Sarode, Lawrence Solberg Jr, Adam E. Haynes, Mark A. Crowther*
http://bloodjournal.hematologylibrary.org/content/122/24/3879.full

# Advanced Hospital Medicine Fellowship Program

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**INTRODUCTION:**
The hospitalist field was founded on the premise that inpatient generalists could improve the care of hospitalized patients and systems of inpatient care. In the early years, the challenge was to determine whether the field was indispensable. We now know that it is (1). Increased emphasis on improving quality and patient safety in hospitals, growing pressures to reduce costs and new limits on residency work hours have all led to an explosion in the number of physicians who work solely in hospitals(2). It is the fastest growing specialty in the United States, and perhaps in American medical history. There are about 30,000 hospitalists for 50,000 opportunities across the country (3). The challenge now is that hospitalists are often seen as the solution to all sorts of problems for which they were never prepared or trained during residency training. Managing this demand is the greatest challenge of the field. Current residency training may require changes in education and training, to develop competing goals and priorities, and face new issues in their relationships with health plans, hospitals, and other physicians (4). Internal medicine and family medicine residency training provide good clinical grounding in inpatient work, but they lack in some aspects what is required to be an effective and efficient hospitalist. The increasing number of practicing hospitalists points to the need for careful consideration of whether they have been trained appropriately for their work and of modifying future training accordingly. Currently a hospitalist is not only required to be a champion in inpatient care but also a leader in patient safety and clinical quality initiatives. Hospitalists are also required to understand the financial and fiscal aspects while at the same time work as a teacher, mentor and role model for the medical students and residents (5,6,7,8).

The Institute of Medicine Health Professions Education Summit in 2002, addressed the objective of "How do we educate health professionals to deliver evidence-based, patient-centered care delivered by interdisciplinary teams using quality improvement and informatics as the foundation?" Over 150 leaders and experts from the health professions of education, regulation, policy, advocacy, quality, and industry attended the Health Professions Education Summit to discuss and help the IOM develop strat-

egies for restructuring clinical education to be consistent with the principles of the 21st-century health system. The report says that doctors, nurses, pharmacists and other health professionals are not being adequately prepared to provide the highest quality and safest medical care possible, and there is insufficient assessment of their ongoing proficiency.

The report states that educators and accreditation, licensing and certification organizations should ensure that students and working professionals develop and maintain proficiency in five core areas: delivering patient-centered care, working as part of interdisciplinary teams, practicing evidence-based medicine, focusing on quality improvement and using information technology (9).

One of the strategies for addressing these issues is faculty development that builds a faculty member's capacity to teach and conduct clinical research. The Advanced Fellowship in Hospital Medicine is designed to help hospitalists tailor a more focused career. It will allow physicians to develop leadership skills which are considered essential for modern hospitalists, learn how to be a teacher and mentor, conduct clinical research, focus on performance improvement and gain more clinical experience—all while learning about the business side of hospital medicine.

There are already a lot of hospital medicine programs successfully running in the country. The Society of Hospital Medicine (SHM) maintains a list of fellowship programs for hospitalists (10). There are a total of 57 programs already registered with the Society of Hospital Medicine. (20 internal medicine, 12 family medicine, 24 pediatrics and 1 psychiatry).

**Impact of Hospital Medicine Fellowship Program:**

The Advanced Fellowship in Hospital Medicine has potential for long term benefit—successful recruitment and retention, improvement in clinical care delivery, new clinical and educational program development, successfully funded research and national recognition beyond the benefit to the parent institution.

Quality Patient Care:
Fellows will be well trained in taking care of the patients in the hospital with emphasis on medical ethics, clinical quality, and evidence-based medicine. Clinical effectiveness, consultative medicine, bedside procedures, critical care, inpatient infectious disease, long term acute care, medical ethics, palliative care and preoperative medicine constitute possible clinical areas of concentration for the fellows. It will improve over-all care of patients as well as patient satisfaction.

Research and academic Culture**:**
The associated research necessary to define evidence-based practices and patient-centered quality care for these patients by adequately trained clinician researchers mandates training of a cohort of investigators to meet this challenge. Without sufficient role models and associated career training pathways Hospital Medicine academic programs cannot expect to address these challenges facing them today. Fellowship training programs that target additional clinical and educational research training opportunities are essential to improve educational outcomes, to advance the science of the discipline, to improve patient care and to attract a new cohort of trainees dedicated to this field.

**"**Pipeline" for future faculty recruitment:
A successful fellowship program will lead to the recruitment of additional faculty needed to meet expanding hospitalist clinical service programs that benefit the Department of Medicine and Family Medicine and the Hospital.

National Recognition:
The program has the potential to expand its influence beyond the University of Missouri Health Care Sciences (UMHCS) with regional and national recognition. We anticipate that each fellow will present at professional meetings with travel funds provided for this purpose. Each fellow will be expected to attend at least one professional meeting. Fellows are expected to present their research and projects in a nationally recognized forum such as the society of hospital Medicine, the Society of General Internal Medicine, the Society of Teachers of Family Medicine, the Association of American Medical Colleges annual and regional meetings, American Geriatric Society and other professional specialty groups.

**References:**


1. Wachter, R. (2006). "The hospitalist movement 10 years later: life as a Swiss army knife." MedGenMed: Medscape general medicine 8(3): 30
2. Baker, S. (2006). "Hospitalists No Longer Novel." Managed Care.
3. Hatt, K. (2013). "Hospitalists: A Worthy Investment." Executive Insight Vol. 4 (April): Page 47.
4. Natarajan, P., et al. (2009). "Effect of hospitalist attending physicians on trainee educational experiences: a systematic review." Journal of Hospital Medicine 4(8): 490-498.
5. Parker, R. M., et al. (2003). "Health literacy, a policy challenge for advancing high-quality health care." Health Affairs 22(4): 147-153.
6. Pham, H. H., et al. (2005). "Health care market trends and the evolution of hospitalist use and roles." Journal of General Internal Medicine 20(2): 101-107.
7. Soong, C, et al. (2010). "Hospitalist physician leadership skills: perspectives from participants of a leadership conference." Journal of Hospital Medicine 5(3): E1-E4.
8. Whitcomb, W. F. and J. R. Nelson (1999). "The role of hospitalists in medical education." The American journal of medicine 107(4): 305-309.
9. Institute of Medicine *"Bridging the Quality Gap"*, April 8, 2003, *Health Professions Education*
10. http://www.hospitalmedicine.org/Content/NavigationMenu/Education/HospitalMedicinePrograms/Hospitalist_Fellowsh.htm


# Diagnostic Dilemma


Sudharshan Balla, MD
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**Questions:**

1. 65-year-old male with history of CAD was referred by orthopedic surgeon for pre-operative risk stratification. He had h/o severe osteoarthritis of his right knee joint preventing him from having an active lifestyle. He is unable to walk beyond a block. Right knee arthroplasty is planned. He has a history of recent myocardial infarction and underwent drug eluting stent (DES) placement to his LAD five months ago. His other medical comorbidities included hypertension, hyperlipidemia and obesity. Medications included aspirin, clopidogrel, metoprolol, pravastatin and Lisinopril. Your recommendation with regard to the next course of action:

    a. Perform stress testing
    b. Obtain echocardiogram
    c. Discuss about deferring surgery
    d. Proceed with surgery; no further testing required

2. 57-year-old female is admitted for severe right lower quadrant abdominal pain. Evaluation revealed a ruptured appendix. Past medical history is significant for CAD with PCI to the RCA with a DES four months ago, history of Type 2 Diabetes Mellitus on insulin, chronic kidney disease with a creatinine of 2.2 mg/dl. To manage the multiple comorbidities, medicine service is consulted for preoperative risk assessment. Your recommendation to the surgeon would be:

a. Obtain stat echocardiogram
b. Start heparin drip and proceed to surgery
c. Proceed with surgery
d. Antibiotics and defer surgery

3. 45 year old male with history of aortic valve replacement with a bi-leaflet mechanical valve on anticoagulation with coumadin is admitted with abdominal pain and jaundice. Evaluation reveals obstructive jaundice with stone in the common bile duct. Acute cholangitis is diagnosed. ERCP is planned. He has no other medical conditions. INR is 2.2. Next step in the management:

a. Stop Coumadin and bridge with UFH
b. Stop Coumadin and bridge with LMWH
c. Administer Vitamin K and proceed when INR <1.5
d. No bridging needed, stop Coumadin and proceed when INR < 1.5

**Answers on page 12**

# ID Corner

William Salzer, MD
Professor, Division of Infectious Diseases, University of Missouri Health Care

**The NEJM is running a series of review articles on Critical Care Medicine- here is one on sepsis:**

Angus DC, T van der Poll. Severe sepsis and septic shock. N Engl J Med 2013;369: 840-851.
http://www.nejm.org/doi/pdf/10.1056/NEJMra1208623

# ASK A PATHOLOGIST

Emily Coberly, MD, Jack Campbell, PSF, and Richard Hammer, MD
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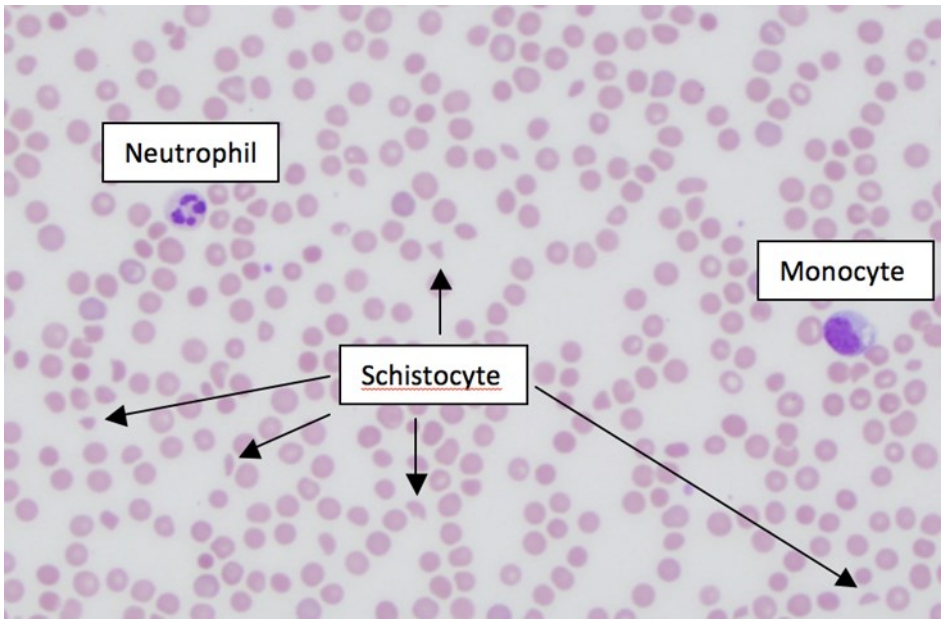
**QUESTION:** I took care of a patient with Disseminated Intravascular Coagulation (DIC), but the pathologist did not see schistocytes on the patient's peripheral blood smear. What is the role of peripheral smear in diagnosing DIC?




**ANSWER:** Peripheral smears are frequently ordered to look for schistocytes as part of the work-up for patients with suspected DIC. Schistocytes are red blood cell fragments (see image) created by mechanical trauma to circulating red cells; schistocytes may be elevated in patients with mechanical heart valves, thrombotic microangiopathic anemia (TTP/HUS), HELLP syndrome, malignant hypertension, and metastatic malignancy. Low numbers of schistocytes can also be seen in DIC, however they are usually within or near the reference range of <0.5%. The count of schistocytes in DIC rarely has a specific clinical diagnostic value. Using schistocytes as a first-line diagnostic test for DIC is only 23% sensitive and 73% specific.

While there is no single test that can accurately establish or rule out the diagnosis of DIC, the International Society on Thrombosis and Hemostasis has developed a scoring system for diagnosing DIC using platelet count, prothrombin time, fibrinogen, and D-dimer or fibrin degradation product. A score of 5 or more on this scale is 93% sensitive and 98% specific for DIC. The components of this score are as below.

- Platelet count (>100,000/μL = 0, 100,000 – 50,000/μL = 1, <50,000/μL = 2)
- Elevated fibrin marker (e.g. D-dimer, fibrin degradation products) (no increase = 0, moderate increase = 2, strong increase = 3)
- Prolonged PT (<3s = 0, >3 but <6s = 1, >6s = 2)
- Fibrinogen level (>1g/l = 0, <1g/l = 1)

Score >5 is compatible with overt DIC: repeat score daily
Score of <5 is suggestive for non-overt DIC: repeat next 1–2 days

References:

1. Lesesve JF, Martin M, Banasiak C, Andre-Kemeis E, Bardet V, Lusina D, Kharbach A, Genevieve F, Lecompte T. Schistocytes in disseminated intravascular coagulation. Int J Lab Hematol. 2013 Nov 22.
2. Levi M, Meijers JC. DIC: Which laboratory tests are most useful. Blood Reviews 25. 2011, 33-37.

3. Yu M, Nardella A, Pechet L. Screening tests of disseminated intravascular coagulation: Guidelines for rapid and specific laboratory diagnosis. Critical Care Medicine 28(6). June 2000, 1777-1780.
4. Zini G, d'Onofrio G, Briggs C, Erber W, Jou JM, Lee SH, McFadden S, Vives-Corrons JL, Yutaka N, Lesesve JF. ICSH recommendations for identification, diagnostic value, and quantitation of schistocytes. Int Jnl Lab Hem. 2012, 34, 107-116.

**Send your questions to coberlye@health.missouri.edu to be published in future editions of the Missouri Hospitalist.**

# Diagnostic Dilemma

**Answers:**

**1) C**
Patient is planned for an elective procedure. He has history of recent placement of a drug eluting stent (DES). He is at risk of stent thrombosis with premature discontinuation of dual antiplatelet therapy (DAPT) (<12 months after placement of a DES). Patient should be counselled to defer surgery until it is safe to discontinue clopidogrel. Although data is emerging that it may be safe to stop DAPT early (some trials have shown 3-6 months of DAPT is safe), until guidelines are updated it may be safe to postpone surgery until he completes at least 6 months and possibly even 12 months of DAPT.

**2) C**
Patient does not need any further workup from a cardiac standpoint. Any workup would delay the definitive therapy which in the case of a ruptured appendix is emergent surgery.

3) **D**
Patient has a bi-leaflet valve in aortic position which is associated with low risk for thromboembolic events. Therapeutic ERCP is a procedure associated with high bleeding risk. He does not have risk factors like stroke, TIA or prior embolism which would put him at high risk for thromboembolic events. No bridging is needed in this scenario. Mechanical valves in mitral position are associated with high thrombotic risk and will need bridging with UFH peri-procedurally. It is not advisable to use Vitamin K in patients with mechanical valves.

MISSOURI HOSPITALIST SOCIETY

## CONFERENCE CALENDAR

(Click on Conference Title to View Webpage)

Update in General Internal Medicine for Specialists 2014
Dates: January 27-31, 2014
Venue: Boston, Massachusetts

Primary Care Update
Dates: February 17-19, 2014
Venue: Lake Buena Vista, Florida

Update in Hospital Medicine
Dates: February 27-28, 2014
Venue: Seattle, Washington

Hospital Medicine: Management of the Hospitalized Adult Patient
Dates: March 24-28, 2014
Venue: Sarasota, Florida

Hospital Medicine 2014
Dates: March 24-27, 2014
Venue: Las Vegas, Nevada

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Archived Issues:
https://www.missouriacp.org/index.php?page_id=22

## Hospital Medicine Fellowship

**UNIVERSITY *of* MISSOURI**

The University of Missouri School of Medicine has an opening for two Hospitalist Fellows beginning July 1, 2014. This one-year, SHM-registered fellowship further develops clinical, teaching, research, leadership and business skills. Application and additional information and instructions can be found on the program's website:

**http://medicine.missouri.edu/imed/adv-fellowship.html**

*UMC is an equal opportunity, affirmative action employer and complies with the ADA act of 1990. Women and minorities are encouraged to apply. Questions and ADA accommodation needs may be addressed to Kim Jones-Jackson, Human Resources Manager, 573-884-2825, Department of Medicine, UMC, MA438 Medical Science Building, Columbia, MO 65212.*

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