New Beginnings and Painful Endings

Impact of Robotic System on Hysterectomy Trends

What’s Old Is New Again – Diagnosing Measles
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VOLUME 87    FEBRUARY 2015     NUMBER 2

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On the Cover: “Chair I” by Marlene Dubin, 20 x 20 mixed media,
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New Beginnings and Painful Endings

Nancy Fan, MD

New beginnings are often disguised as painful endings.  — Lao Tzu

At the time of this article, opening arguments are being presented to the Supreme Court in King vs. Burwell. The case explores the legality of the federal subsidies for state health exchanges under the Affordable Care Act. While a decision may not be available until June, the ACA is only one example of the tsunami of changes that have occurred in the delivery of health care in the United States in just the last five years. This is a review of how a few of these changes have occurred in Delaware and the open question of whether these are new beginnings or painful endings.

According to the February 2015 Plan Management Update, provided by the Department of Health and Social Services, 21,276 individuals have enrolled in the health marketplace, Choose Health Delaware. Additionally, 9,611 individuals enrolled in Medicaid, for a total of 30,887. Again, regardless of how one feels about the ACA and these requirements, it is the vehicle through which more patients may have better access to care and improve their health with preventive care, rather than only using care in acute care settings, such as the emergency room. However, I believe it is the reality of implementation that has been disconcerting and frustrating for physicians. Just to name a few, these may include the administrative burden of checking coverage, establishing new patients with possibly complicated medical histories, and the acquisition of new patients who may never come to the office but only show up at the hospital. In addition, there are the above legal concerns with the federal subsidies and how a Supreme Court decision might affect the Delaware marketplace, as well as being the first year for tax filing regarding any tax credits or fines for
health insurance coverage. Such challenges may make it difficult to see how the ACA actually helps physicians practice “quality” medicine. Maybe one aspect of this “new beginning” should be the transformation of the marketplace from being only an access/coverage platform to one providing patient education at the local level, maybe through care coordination navigators much like the insurance navigators. There should be an incorporation of practicing physicians to craft the education message for patients regarding basic quality preventive care, such as vaccinations, cancer screening, cardiac risk screening, and the importance of routine well visits, not just acute sick visits. While this is yet another “ask” of your time, the long term goal of healthier patients who assume the responsibility to use primary care physicians as their point of care will reflect more accurately the quality medicine that you practice every day.

This segues into the next “new beginning” which is the Delaware Center for Health Innovation. DCHI was formed last year as the infrastructure to “house” health care innovation, especially those that were outlined in the CMMI grant proposal with the awarding of a $35 million grant over the next four years. There are five committees: Workforce and Education; Healthy Neighborhoods; Patient and Consumer Advisory; Clinical; and Payment. Obviously the last two committees directly affect physicians and have significant physician participation, including myself, both as a Board member as well as Chair of the Clinical Committee. As the DCHI explores and promotes innovative health care models, with concepts such as care coordination, practice transformation and value-based payment, it may seem the “death” of fee for service, i.e. the painful ending. Is it so terrible though, to move away from volume as a way to sustain a practice? Possibly, participation in physician-driven transformative models, such as the Mednet/Highmark ACO, can ease this transition and provide the tools to succeed in incorporating care coordination and changes in one’s practice to provide quality care but at lower costs, with the savings as a benefit to the physician. I also believe greater physician participation in the development of workforce models and the community-based healthy neighborhoods are essential so that physician concerns and needs are included. I am open to meeting with any physician regarding more information about the DCHI.

Finally, the MedNet/Highmark ACO is one example of several new health care models in Delaware which incorporate in some form the concepts of an accountable care organization, value-based payments, and physician care coordination networks. I will discuss in much more detail in my President’s Page next month the impact of these concepts on the structure of physician practices, the reality of implementation, as well as physician satisfaction and sustainability. There is a national trend showing a decrease in independent physician practices, which the American Medical Association has reported as at least a 2 percent decline per year, since 2010. With reimbursements tied to the use of EHRs, statistical measures, performance outcomes and the like, some physicians are not equipped to meet these requirements or cannot financially afford the purchase and implementation of these systems and face looming penalties for non-compliance. As a result, many physicians in these situations give up their independence and move to an employed status in order to be able to meet these requirements. I personally do view this trend as a “painful” ending, as independent physicians offer enormous value to the health care system, but with some understanding and analysis, hope to provide a perspective that it may also be a new beginning. To be continued in next month’s issue……

Nancy Fan, M.D.
President, Medical Society of Delaware
NCI PROTOCOL OF THE MONTH

ECOG 3A06: Randomized Phase III Trial of Lenalidomide Versus Observation Alone in Patients with Asymptomatic High-Risk Smoldering Multiple Myeloma

The objectives of the trial are:

**Primary Objective:**
To compare progression free survival where failure is defined as death or the development of symptomatic myeloma indicating treatment between patients receiving lenalidomide versus observation alone in high-risk asymptomatic, smoldering multiple myeloma.

**Secondary Objectives:**
1. To determine and compare the response rate, time to progression, 1-year progression-free survival probability, and overall survival between patients randomized to receive lenalidomide or observation in the setting of asymptomatic myeloma.
2. To estimate the incidence of adverse events in patients receiving lenalidomide therapy for early-stage multiple myeloma.

**Correlative Objectives:**
1. To evaluate the impact of therapy within GEP-defined risk groups and GEP as a prognostic marker.
2. To study the effects of lenalidomide on laboratory markers of immune function.
3. To study the prognostic value of MRI detected asymptomatic bone disease on clinical outcome.
4. To evaluate the prognostic effect of baseline high-risk cytogenetic abnormalities on clinical outcome.

**Quality of Life Assessment Objectives:**
1. To compare QOL change between treatment and observation arms based on the functional and physical well-being.
2. To examine the impact of differential treatment response, if observed, on QOL.
3. To obtain prospective data on Myeloma specific QOL attributes, utilizing and evaluating the Multiple Myeloma Subscale.

**Eligibility:**
1. Patients must be diagnosed with asymptomatic high-risk smoldering multiple myeloma within the past 60 months, as confirmed by both of the following:
   - Bone marrow plasmacytosis with \( \geq 10\% \) plasma cells or sheets of plasma cells at any time before initiating study treatment, including a marrow which must be obtained by bone marrow aspiration and/or biopsy within 4 weeks prior to randomization.
   - Abnormal serum free light chain ratio (\(< 0.26 \) or \( > 1.65 \)) by serum FLC assay. FLC assay must be performed within 28 days of randomization.
2. Patients must have measurable levels of monoclonal protein: \( \geq 1g/dL \) on serum protein electrophoresis or \( \geq 200 \) mg of monoclonal protein on a 24 hour urine protein electrophoresis which must be obtained within 4 weeks prior to randomization.
3. Patients must have no lytic lesions on skeletal surveys and no hypercalcemia.
4. Hemoglobin, Platelet count, ANC, Calculated creatinine clearance, Bilirubin, SGPT and SGOT must be obtained within four weeks prior to randomization.
5. No prior or concurrent systemic or radiation therapy for the treatment of myeloma.
6. Patients with a history of prior malignancy are eligible provided they were treated with curative intent and have been free of disease for the time period considered appropriate for cure of the specific cancer. For most diseases this time frame is 5 years.

**Treatment:**

**Arm 1:** Lenalidomide 25 mg by mouth days 1-21 every 4 weeks (28 days) and aspirin by mouth days 1-28. Continue treatment until disease progression or toxicity.

**Arm 2:** Observation. Continue observation until disease progression.

For information regarding clinical trials or if you would like to have the list of open protocols e-mailed to you, please call the Cancer Research Office at (302) 623-4450 or e-mail akee@christianacare.org.
Impact of a Robotic Surgical System on Hysterectomy Trends

Megan N. Wasson, DO1 and Matthew K. Hoffman, MD, MPH2

Abstract

Objective: To determine the impact of introduction of a robotic surgical system on hysterectomy trends.

Methods: A retrospective, cohort study using longitudinal medical records from a tertiary care community hospital was used to determine the surgical approach to hysterectomy. For the purposes of analysis, surgical approaches were categorized as robotically assisted, laparoscopic, laparotomy, vaginal, or laparoscopically assisted vaginal.

Results: A total of 4,440 women underwent a hysterectomy between January 2007 and December 2012 (benign gynecology N=3,127, gynecologic oncology N=1,001, urogynecology N=312). Amongst benign gynecologists, during the five years following introduction of the robotic system, the rate of hysterectomy performed via laparotomy decreased from 62.2 percent to 39.1 percent, p-value <0.001. The rate of robotically assisted hysterectomy increased from 0.0 percent to 26.4 percent, p-value <0.001. When subspecialties were examined, the rate of hysterectomy performed by a gynecologic oncologist via laparotomy decreased from 89.7 percent to 20.0 percent, p-value <0.001. The rate of robotically assisted hysterectomy increased from 0.0 percent to 78.3 percent, p-value <0.001. Amongst urogynecologists, the rate of hysterectomy performed vaginally decreased from 80.0 percent to 33.6 percent, p-value <0.001, while the rate of robotically assisted hysterectomy increased from 0.0 percent to 54.2 percent, p-value <0.001.

Conclusions: The percentage of robotically assisted hysterectomies has dramatically increased and is now the primary modality for performing hysterectomy amongst subspecialists.

Key Words: hysterectomy, surgical approach, robotics, laparoscopy

INTRODUCTION

Hysterectomy has become one of the most commonly performed surgical procedures and is estimated to be performed in one out of every nine women.1 Following the first reported laparoscopic hysterectomy in 1989, the national trend towards minimally invasive approaches to hysterectomy has had a strong influence on surgical practice.2,3 Minimally invasive approaches, such as laparoscopic hysterectomy, have been shown to be superior to abdominal hysterectomy as they avoid a large abdominal incision, have fewer wound-related complications, and dramatically decrease the level of postoperative pain.4 When hysterectomies are performed via a minimally invasive approach, they are associated with a lower incidence of complications, shorter hospital stay, and faster rehabilitation.5

Although a hysterectomy can be performed using one or a combination of abdominal, vaginal,
laparoscopic, or robotically assisted approaches, the choice of surgical approach is determined by numerous considerations. These factors include the indication for the procedure, concomitant procedure, surgeon experience, and patient preference. The American Congress of Obstetricians and Gynecologists recommends that when choosing the route and method of hysterectomy, the manner in which the procedure may be performed most safely and effectively to fulfill the medical needs of the patient need to be considered.

Over the last decade, the proportion of hysterectomies being performed abdominally has decreased, while the overall proportion of minimally invasive hysterectomies has increased. In 1998, abdominal hysterectomies accounted for 65 percent of all hysterectomies but by 2010 the proportion of cases performed abdominally declined to 54.2 percent. As more surgical training is provided in minimally invasive approaches and technology becomes more widely accessible, it is predicted that laparoscopic, laparoscopically assisted vaginal, and robotically assisted hysterectomies will be performed more commonly. Although the national trends have been followed, there is little information on the impact of particular technology availability at a single institution. We performed a retrospective cohort study to assess changes in hysterectomy trends following the addition of a robotic surgical system at a single institution.

**MATERIALS AND METHODS**

After Institutional Review Board approval was obtained from Christiana Care Health System, a cohort of patients was obtained by searching the perioperative patient database at the institution. International Classification Diagnosis-9 (ICD-9) procedural codes indicating a hysterectomy was performed during the hospital admission were used to identify patients for inclusion. All patients undergoing a hysterectomy by a gynecologist between January 2007 and December 2012 were identified. Exclusion criteria included hysterectomies performed by surgeons without formal gynecologic training, as well as those performed at the time of cesarean delivery, as this surgical procedure is unable to be completed via alternative means.

Following identification, data was collected using a standardized web based data entry system. Surgical approach to hysterectomy was first identified based on ICD-9 procedural codes and then verified utilizing manual review of the electronic medical record. Perioperative nursing reports and physician operative reports were analyzed. When discrepancies arose, the hysterectomy modality described in the physician operative report was employed for analysis.

For the purposes of analysis, surgical approaches were categorized as robotically assisted, laparoscopic, laparotomy, vaginal, or laparoscopically assisted vaginal. Surgical procedures that began with one approach, but were converted to an alternative approach were classified according to the final method utilized. To reduce confounding variables, patients were further classified according to level of subspecialty training of the operating physician. Hysterectomies performed by general gynecologists, gynecologic oncologists, and urogynecologists were analyzed independently.

For statistical analysis, the proportion of hysterectomies performed via the various modalities during each time period of interest was examined. This allowed for accurate assessment of the trends despite the addition or loss of individual surgeons and temporal fluctuations in operative practices.
RESULTS

From January 2007 to December 2012, a total of 4,440 women underwent a hysterectomy and met inclusion criteria (benign gynecology N=3,127, gynecologic oncology N=1,001, urogynecology N=312). Amongst benign gynecologists, in the first quarter of 2007, 0.0 percent of hysterectomies were robotically assisted, 0.7 percent were laparoscopic, 62.2 percent were via laparotomy, 22.2 percent were vaginal, and 14.8 percent were laparoscopically assisted vaginal. After five years of access to a robotic surgical system, 26.4 percent of hysterectomies were robotically assisted, 14.6 percent were laparoscopic, 39.1 percent were via laparotomy, 9.1 percent were vaginal, and 10.9 percent were laparoscopically assisted vaginal. All trends were statistically significant with a p-value <0.001 (Figure 1, Table 1).

When subspecialties were examined, the rate of hysterectomy performed by a gynecologic oncologist via laparotomy decreased from 89.7 percent (Q1, 2007) to 20.0 percent (Q4, 2012), p-value <0.001. In contrast, the rate of robotically assisted hysterectomy increased from 0.0 percent (Q1, 2007) to 78.3 percent (Q4, 2012), p-value <0.001. Vaginal hysterectomies and laparoscopically assisted vaginal hysterectomies were not greatly affected by the addition of a robotic surgical system (Figure 2, Table 2).

Amongst urogynecologists, the rate of hysterectomy performed vaginally peaked in 2008 at 91.2 percent. Since that time, the rate of vaginal hysterectomies declined abruptly starting in 2009 to a current rate of to 33.6 percent (2012), p-value <0.001. In contrast, urogynecologists began performing robotically assisted hysterectomies in 2009 (2.7 percent). Since that time, the rate has steadily increased to a

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current rate of 54.2 percent (2012), p-value <0.001. The rate of laparoscopic, laparoscopically assisted vaginal, and hysterectomies via laparotomy was not statistically different over time (Figure 3, Table 3).

**DISCUSSION**

In 2013, Wright et al. evaluated robotically assisted versus laparoscopic hysterectomies. It was demonstrated that three years following the introduction of robotic technology, robotically assisted hysterectomies accounted for 10 percent of all hysterectomies. Additionally, when only hospitals with access to robotic technology were included, it was found that robotic procedures accounted for more than 20 percent of all hysterectomies within three years of robotic utilization and there was a decline in the rate of vaginal, abdominal, and laparoscopic hysterectomies.

Similarly, Yamasato et al. examined the impact of robotic surgery on hysterectomy trends. Prior to the introduction of the robotic surgical system, general gynecologists performed 90.6 percent of hysterectomies via an abdominal approach. After six years of utilization, 56.4 percent of all hysterectomies were performed with robotic

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<td>27.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>65.5</td>
<td>32.7</td>
<td>1.8</td>
<td>0.0</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>65.0</td>
<td>33.3</td>
<td>1.7</td>
<td>0.0</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>79.7</td>
<td>20.3</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>2012</td>
<td>1</td>
<td>73.0</td>
<td>25.4</td>
<td>0.0</td>
<td>1.6</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>78.7</td>
<td>21.3</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>88.7</td>
<td>11.3</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>78.3</td>
<td>20.0</td>
<td>1.7</td>
<td>0.0</td>
</tr>
</tbody>
</table>
assistance and only 39.9 percent were performed abdominally. Amongst gynecologic oncologists, the rate of abdominal hysterectomy declined from 94.6 percent to 41.3 percent over the same time period, while robotic hysterectomies increased to account for 58.0 percent of cases. Urogynecologists were found to perform 10.3 percent of hysterectomies robotically after six years of use. Interestingly, the rate of vaginal hysterectomies performed by urogynecologists increased from 70 percent to 81.2 percent over the same study interval.

Brenot et al. also examined hysterectomy modalities in the 18 months prior to and following the addition of a robotic surgical system. It was shown that availability of this technology resulted in a decrease in abdominal hysterectomies from 62 percent to 50 percent, while robotically assisted hysterectomies rose from 0 percent to 32 percent.

Our study showed that the addition of a robotic surgical system causes significant changes in the surgical approach to hysterectomy. Our findings are consistent with those of Wright et al., Yamasato et al., and Brenot et al. in that the addition of a robotic surgical system decreases the volume of hysterectomies performed via laparotomy and increases those performed with the assistance of a robotic surgical system. The consistency in our findings strongly indicates that the addition of a robotic surgical system causes a dramatic increase in the percentage of robotically assisted hysterectomies after only five years of availability.

Amongst benign gynecologists, adoption of robotic technology has resulted in a steady decline in the proportion of hysterectomies being performed via laparotomy and rise in those being performed with robotic assistance. The trends in robotically assisted hysterectomies and hysterectomies via laparotomy have yet to plateau. The trends amongst subspecialists were most dramatic with robotically assisted hysterectomy emerging as the primary modality at our institution. Amongst gynecologic oncologists, the rate of hysterectomies being performed via laparotomy has dramatically decreased. Similarly, vaginal hysterectomies have drastically declined amongst urogynecologists and are no longer the preferred method.

**CONCLUSIONS**

In summary, we believe that our study is consistent with prior studies that have demonstrated an increase in robotically assisted hysterectomies and an associated decrease in abdominal hysterectomies following addition of a robotic surgical system. This impact is greatest amongst subspecialty trained gynecologic oncologists and urogynecologists. Given the trends demonstrated, it is evident that availability of robotic surgery is greatly impacting the surgical approach to hysterectomy.

**Table 3.** Proportion of hysterectomies performed by urogynecologists according to surgical approach and year.

<table>
<thead>
<tr>
<th>Year</th>
<th>Robotically Assisted (%)</th>
<th>Laparoscopic (%)</th>
<th>Laparotomy (%)</th>
<th>Vaginal (%)</th>
<th>Laparoscopically Assisted Vaginal (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>80.0</td>
<td>20.0</td>
</tr>
<tr>
<td>2008</td>
<td>0.0</td>
<td>0.0</td>
<td>5.9</td>
<td>91.2</td>
<td>2.9</td>
</tr>
<tr>
<td>2009</td>
<td>2.7</td>
<td>0.0</td>
<td>0.0</td>
<td>89.2</td>
<td>1.7</td>
</tr>
<tr>
<td>2010</td>
<td>13.0</td>
<td>0.0</td>
<td>9.3</td>
<td>74.1</td>
<td>3.7</td>
</tr>
<tr>
<td>2011</td>
<td>21.5</td>
<td>7.7</td>
<td>4.6</td>
<td>58.5</td>
<td>7.7</td>
</tr>
<tr>
<td>2012</td>
<td>54.2</td>
<td>4.7</td>
<td>7.5</td>
<td>33.6</td>
<td>0.0</td>
</tr>
</tbody>
</table>
the surgical milieu of gynecology. Given this shift, researchers must now focus, not on laparotomy versus laparoscopy, but rather on the outcomes associated with robotically assisted surgery versus other minimally invasive approaches. Additionally, the impact on resident education and competency has yet to be fully elucidated.

REFERENCES

CASE REPORT

What's Old Is New Again – A 25-Year-Old Female with Fever and Rash

Lauren Branditz, MD¹ and Jonathan McGhee, DO, FACEP, FAAEM²

CME available and post test questions are on page 59.

CASE PRESENTATION

On January 24, 2015, a 25-year-old female with no significant past medical history, other than acne, presented to the emergency department (ED) for a rash. The patient reported having six days of fevers associated with nausea and a nonproductive cough. When her symptoms began, she went to an urgent care center where a rapid influenza test was performed and found to be negative. Despite the negative influenza test, she was prescribed a course of Tamiflu and completed that therapy. Three days later, and three days prior to her ED presentation, the patient developed a “cold sore” on her upper lip and went back to the urgent care center. There, she was given a single dose of Valtrex. The patient continued to have fevers and nausea. She was febrile to 103.7°F on the day of her ED presentation. She vomited once the day prior to ED presentation and had several episodes of diarrhea. She also noted development of a rash, but was not sure which day this began to develop.

Of note, the patient reported recent travel to Singapore and Bali. She arrived back in the United States on January 12, 2015 (12 days prior to ED presentation). In Singapore, the patient reported staying in a hotel in a large city. In Bali, she reported being in rural areas not near the coast. She did not recall any insect bites, nor exposure to anyone who seemed ill. She did not take anti-malarial prophylaxis during her trip. The only new medication the patient had taken was promethazine with codeine which she took one day prior to ED presentation.

1. Lauren Branditz, MD is an Emergency Medicine Resident at Christiana Care Health System in Newark, Del.
2. Jonathan McGhee, DO, FACEP, FAAEM is a member of the Academic Faculty in the Emergency Medicine Department at Christiana Care Health System in Newark, Del. The authors of this article have no financial disclosures to report.
The patient stated that her rash developed prior to taking this new medication. The rash began on the patient’s face and neck, then spread to her neck and torso. At the time of ED presentation, the rash involved her face, neck, chest, abdomen, back, buttocks, and had begun to spread to her arms. There was no rash on her lower extremities. The patient did admit that since becoming ill six days ago, she had been taking high doses of ibuprofen, 800 mg twice a day. She denied urinary frequency, urinary urgency, or dysuria. Of note, the patient stated that her childhood vaccinations had been completed and were up to date.

**PHYSICAL EXAMINATION**

Vital signs were significant for fever, with initial temperature 38.5°C orally, and tachycardia, with a heart rate of 110. The patient appeared to be in no acute distress. Her pupils were equal round and reactive to light, with intact extraocular muscles and no scleral icterus. Mucous membranes were dry. Buccal mucosa was noted to have several very small white spots. She had no cervical lymphadenopathy. There was no neck stiffness or rigidity. The patient was in no respiratory distress and her lungs were clear to auscultation bilaterally. She was tachycardic though her heart rhythm was regular. There were no murmurs, rubs, or gallops. Her abdomen was soft, and nontender with normal bowel sounds, no organomegaly, and no masses. Extremities were non-tender, with normal range of motion, and no edema. The patient was alert and oriented to person, place, and time. She had no gross motor deficits, no gross sensory deficits, and her cranial nerves were grossly intact. Examination of her skin revealed a maculopapular rash involving the face, neck, chest, abdomen, back, gluteal area, with some involvement of the upper extremities. No rash was visualized on the lower extremities.

**ASSESSMENT/PLAN**

Differential diagnosis was initially somewhat broad, but included most significantly viral exanthema, allergic reaction, adverse drug reaction, rubeola, dengue fever, and malaria. Allergic reaction was thought to be less likely as the patient had no known new exposures prior to the development of her rash. A possible drug reaction to Tamiflu or Valtrex was considered. The patient’s recent travel abroad may have resulted in exposure to dengue fever and/or malaria. Malaria is endemic in Indonesia. Dengue fever is endemic in Southeast Asia. There was significant concern that the patient’s rash and history of present illness may be consistent with measles; particularly as she had known recent history of travel in international airports where there has been recent concern for measles outbreaks. Due to these concerns, the case was discussed with an Infectious Disease consultant who was in agreement with the differential diagnosis described above. Blood smears for evaluation of possible malaria as well as Rubeola titers were obtained. Results of a CBC, BMP, LFTs, and lipase showed elevated AST, ALT, alkaline phosphatase, and total bilirubin.

Repeat lab work the following day showed improvement in the patient’s hepatic function. Abnormal LFT results were later attributed to recent use of isotretinoin as acne treatment. The patient’s physical exam the following day revealed conjunctival injection, absence of buccal membrane findings, and spread of her maculopapular rash, which was noted to now involve her upper thighs in addition to the distribution described the previous day. Further lab work was ordered for evaluation.

Rubeola titers which had been sent out to the Mayo Clinic Laboratories revealed +IgM rubeola but -IgG rubeola indicating positive case of red measles with no evidence of prior vaccination. Blood cultures showed no growth after five days. A rapid plasma reagin test was negative. Influenza A and & B PCR tests were negative. Rocky Mountain Spotted Fever IgG and IgM tests were negative. Test results were conclusive for a diagnosis of red measles as the causative agent for the patient’s illness.

**DISCUSSION**

The incidence of measles, or rubeola, in the United States is increasing. Therefore, medical professionals must be ready to recognize the signs and symptoms of this illness. They must also be aware of risk factors contributing to possible exposure. Measles classically presents initially with symptoms of high fever, cough, coryza, and conjunctivitis. Symptoms develop 7-14
Days after exposure. Two to three days after initial symptom onset, the patient may develop Koplik spots, which are white spots located in the mouth on the buccal mucosa. Three to five days after symptom onset, a maculopapular rash will typically develop on the patient’s face at the hairline. The rash then classically spreads in a downward fashion to involve the neck, trunk, then extremities. High fevers may persist during the development of the rash. Patients are typically considered contagious four days prior to rash development and four days after resolution of the rash.

Measles is highly communicable and is transmitted by airborne or droplet spread. Therefore, patients should quickly be placed in appropriate isolation. It is also important to note that infectious viral particles can remain on inanimate vectors for up to two hours.

Some patients may suffer severe complications of the disease such as pneumonia and encephalitis, which may in fact lead to increased morbidity and even death, especially at extremes of age. For every 1,000 children that acquire the measles, one or two will die from it. Measles may also cause preterm labor in women who are pregnant, and may in fact have serious effects on the fetus such as very low birth weight.

Subacute sclerosing panencephalitis (SSPE) is a rare but usually fatal disease of the central nervous system resulting from a measles infection early in life (particularly if acquired before the age of 2). SSPE tends to occur seven to ten years following an apparent recovery from the initial measles illness, and typically leads to serious and sometimes fatal complications including behavior changes, seizure, dementia, and coma. Immunization from the measles is the only known prevention for SSPE.

All Delaware physicians, laboratories and other health care providers are required by regulation to report patients with measles to the Division of Public Health. Both lab-confirmed and clinical diagnoses are reportable. Report by telephone, fax or other electronic means. Call the Office of Infectious Disease Epidemiology (302-744-4990) or fax 302-223-1540. Reporting enables appropriate public health response and tracking of disease trends in Delaware.

RESOURCES

Low Back Pain:
Not Always a Benign Symptom

Omar Chohan, DO¹ and Erin Kavanaugh, MD²

CASE PRESENTATION

A 62-year-old African American man presented to the Emergency Department (ED) with low back pain that began four weeks ago after lifting a box of groceries. Three weeks ago he began experiencing fevers almost daily (temperatures not recorded by the patient). He has been taking ibuprofen which has been minimally helpful for his fevers and back pain. A full review of systems was performed and was significant only for the above-described back pain, fevers and dysuria. Otherwise he denied any other complaints during a ten system review.

His past medical history is significant for Hepatitis C secondary to a history of intravenous drug abuse in his twenties. His past surgical history is positive for a left nephrectomy in the 1980’s for a primary renal tumor. He is a hairdresser and a pastor. He has a twenty-year history of prior tobacco use, denies drinking alcohol, and is married. Family history is significant for diabetes and prostate cancer in his father. His brother is currently being evaluated for a new diagnosis of leukemia. His mother died from breast cancer. He is not currently on any medications and has no allergies. Of note, at the time of presentation, he had not seen a physician in more than 15 years and is not up to date on any preventive health care screenings or immunizations.

His temperature is 39.4 °C, heart rate of 94, respiratory rate of 16, pulse oximetry of 95 percent on room air, and his blood pressure is 151/85. He is well appearing and in no acute distress. His physical exam is unremarkable except for poor dentition and an abdominal scar from a left nephrectomy. He has no costovertebral angle tenderness. Musculoskeletal exam is negative for bony tenderness over entire length of spine, saddle anesthesia, or neurological deficits.

The results of his basic metabolic panel and complete blood count are within normal limits with the exception of mild reduction in hemoglobin and mildly elevated ESR. Blood cultures were drawn in the ED. (See Table 1)

DIFFERENTIAL DIAGNOSIS

Prior to any imaging, the patient’s initial differential diagnosis at the time of presentation includes: multiple myeloma, pathological compression fracture, pyelonephritis, osteomyelitis, discitis, epidural abscess, malignancy (renal cell versus prostate versus metastasis from unknown primary) and lumbosacral strain.

Computed tomography of the chest, abdomen, and pelvis as well as the lumbar spine was ordered by the ED providers for further evaluation for his presenting symptoms. (Table 2) After imaging results were reported, concern was elevated for prostate cancer and renal cell carcinoma (new primary versus recurrent).

The patient was subsequently admitted to the hospital for continued work up. Additional laboratory data was ordered and filtered back over the next several days. (Table 3)

CONTINUED

MANAGEMENT OF CASE

A prostate examination was performed and he was found to have a firm, irregular and nodular pros-
On digital rectal examination (DRE). Urology was consulted and performed a prostate biopsy via transrectal ultrasound guidance revealing perineural space invasion and a Gleason score of 9 (4+5) involving both cores. Oncology was consulted following these results and based on the history of present illness and radiologic exam review, palliative androgen blockade with degarelix was initiated during the patient’s hospitalization.

**DISCUSSION OF PROSTATE CANCER**

Prostate cancer is the most common cancer in men and the second most common cause of cancer death in men. The incidence of prostate cancer increases with each decade of life and most men are diagnosed beyond 65 years of age; the median age of diagnosis being 72 years. Risk factors for prostate cancer include: African American race, having a first degree relative, or having multiple first degree relatives with prostate cancer history.

The symptoms of prostate cancer are often due to the regional growth of cancer cells within the prostate gland. Approximately 85 percent of prostate cancers originate in the peripheral zones of the prostate gland contributing to the DRE findings commonly seen. Obstructive symptoms are not common unless a patient with prostate cancer additionally has benign prostatic hyperplasia (BPH), which is seen in central zones of the prostate. Signs and symp-
There are several reasons to have a falsely elevated PSA test, including: BPH, tobacco use or recent prostatitis. False negative testing is also possible. The risk from biopsy involves multiple needles being inserted into the prostate under local anesthesia, risk of infection or bleeding, as well as risk of hospitalization. Further, if cancer is diagnosed, it will often be treated with surgery or radiation, which carry risks, including a small risk of death with surgery, loss of sexual function, and loss of control of urination compared to no surgery.1,4

Diagnosing prostate cancer involves many options reviewed in Table 4.

Grading of prostate cancer is done by using the Gleason Score which is based solely upon architectural features of prostate cancer cells and closely correlates with clinical behavior. It is based on the sum of two numbers: the first number is the score of the most common tumor pattern; the second number is the score of the second most common pattern. Lower scores are less aggressive, less invasive, and have a more favorable prognosis.9 A higher score indicates a greater likelihood of having non-organ confined disease, as well as a worse outcome after treatment of localized disease.

Staging of prostate cancer is based on the TNM system which combines information about the extent of the primary tumor (T), lymph node (N) involvement, and presence or absence of distant metastases (M) with the Gleason score of the primary tumor and the serum prostate specific antigen (PSA) level to classify men according to their risk of recurrence.10 Using the TNM system with the Gleason Score and PSA a physician can determine the degree of disease progression.10

Treatment options for prostate cancer depend on the stage and grade of the cancer the patient has. Those options are reviewed in Table 5.

There is no consensus on using any of the PSA modifications (PSA Velocity, Free PSA, Complexed PSA, p2PSA, age-specific/race-specific ranges) and none of them have been shown in clinical trials to reduce the number of unnecessary biopsies or improve clinical outcomes. The total PSA cutoff of 4.0 ng/mL has been the most accepted standard because it balances the tradeoff between missing important cancers at a curable stage and avoiding both detection of clinically insignificant disease and subjecting men to unnecessary prostate biopsies.6,7,8

### Table 4. Diagnostic Modalities for Prostate Cancer in appropriately screened and referred men.

<table>
<thead>
<tr>
<th>Diagnostic Modality</th>
<th>Pearls/Benefits of This Tool</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRUS</td>
<td>Hypoechoic quality of prostate tissue</td>
</tr>
<tr>
<td>Endorectal MRI</td>
<td>Improved visualization of regional spread of disease</td>
</tr>
<tr>
<td>Axial Skeleton MRI</td>
<td>More sensitive than bone scan</td>
</tr>
<tr>
<td>Bone Scan</td>
<td>May miss osteolytic lesions</td>
</tr>
<tr>
<td>Computed Tomography</td>
<td>Similar in efficacy to evaluating bony mets</td>
</tr>
</tbody>
</table>

### CASE UPDATES

The patient was started on a clinical trial of Zometa. As mentioned on physical exam, he had poor...
dentition and needed a dental evaluation before beginning bisphosphonate therapy. Unfortunately he was required to have his upper teeth removed. He did follow up with his newly established primary care physician whom he met in the hospital. Since his hospitalization, his preventive care is (almost!) up to date: he has received influenza, pneumococcal, and Tdap vaccinations, and has been advised to undergo colorectal cancer screening. He has subsequently developed Diabetes Mellitus, which is well controlled at this time.

Despite the clear recommendation by the USPSTF to not screen for prostate cancer, based on this patient’s personal history of a malignancy, risk factors including age and race, and family history of early prostate cancer, it is easy to wonder what would have happened if he had been in the care of a primary care physician during those 15 years where he was lost to care. Would he have (should he have?) been screened? Could his cancer have been detected earlier? He is doing so well…would screening him have changed the outcome significantly?

**Pearls**
- Prostate Cancer is the most common cause of cancer in men and the second most common cause of cancer death in men.
- Screening is still controversial and should involve shared decision making if done at all.

### Table 5. Treatment Options for Prostate Cancer

<table>
<thead>
<tr>
<th>Types of Treatment</th>
<th>Risk Category of Diagnosis</th>
<th>Side Effects</th>
<th>Additional Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Active Surveillance&lt;sup&gt;8, 10&lt;/sup&gt;</td>
<td>Low risk patients</td>
<td>At risk for progression of disease; requires close monitoring</td>
<td>Postpones curative-intended treatment until clinical evidence of progression appears</td>
</tr>
<tr>
<td>Definitive Treatment: Radiation Therapy and/or Radical Prostatectomy; both +/- Androgen&lt;sup&gt;11, 12, 13&lt;/sup&gt;</td>
<td>Low to intermediate risk; all choices in combination can be used for high risk patients</td>
<td>RT: proctitis, enteritis, dysuria, urethritis, erectile dysfunction, fatigue and insufficiency fractures; ADT: impotence, loss of libido, osteoporosis, and possibly cardiovascular issues</td>
<td>Significantly increases survival and decreases mortality when used in combination (PIVOT Trial)</td>
</tr>
<tr>
<td>Palliative Therapy: androgen deprivation, androgen blockade, and pain control&lt;sup&gt;14&lt;/sup&gt;</td>
<td>High risk; metastatic disease; refractory bone pain</td>
<td>Some patients require additional chemotherapy if they experience castration resistant disease</td>
<td>Requires either surgical bilateral orchectomy or medical orchectomy; addition of bisphosphonates often indicated</td>
</tr>
</tbody>
</table>

### REFERENCES

CME POST TEST QUESTIONS

Educational Objectives

• Recognize the clinical features of the measles virus and possible complications;
• Describe how to diagnose measles; and
• Illustrate reporting requirements in Delaware.

Publication Date: February 2015
Expiration Date: February 2017

Participants

This program is designed for physicians who wish to increase their ability to recognize the measles virus in the practice of medicine.

Accreditation

The Medical Society of Delaware is accredited by the Accreditation Council for Continuing Medical Education to provide continuing medical education for physicians. The Medical Society of Delaware designates this journal-based CME activity for a maximum of 1 AMA PRA Category 1 Credit™. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

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You may earn credit by reading the CME-designated article in this issue of the DMJ, completing the post test and claiming your credit. Fax (302-366-1354) or mail in the completed examination c/o MSD Journal CME, to the Medical Society of Delaware, 900 Prides Crossing, Newark, DE 19713. MSD members can claim up to 1 AMA PRA Category 1 Credit™ per examination. Credit will be awarded only if a score of at least 80 percent is achieved on the examination.

Circle the single best response for each question:

1. Classic rash distribution of measles begins on _____ and spreads _____.
   A) the hairline; downward to the trunk
   B) the trunk; peripherally to the extremities
   C) the extremities involving the palms and soles; to the trunk
   D) the extremities sparing the palms and soles; to the trunk

2. Infectious viral particles can remain on inanimate vectors for up to _____.
   A) 1 hour
   B) 2 hours
   C) 3 hours
   D) 12 hours

3. All of the following are symptoms of measles except:
   A) conjunctivitis
   B) high fever
   C) maculopapular rash
   D) headache
   E) cough

4. The measles virus is spread via respiratory droplet.
   A) True
   B) False

5. All may be severe complications of the measles except:
   A) anemia
   B) encephalitis
   C) preterm labor
   D) pneumonia

☐ I claim 1 AMA PRA Category 1 Credit™

Please provide the following information in order receive credit for this CME activity.
Please print.

NAME __________________________
ADDRESS _____________________________________________________________
E-MAIL ________________________________________________________________
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For a media kit or for more information, call Kathy Jackson at 302-224-5185 or 800-348-6800 ext. 231 (Kent or Sussex Counties) or email Kathy.Jackson@medsocdel.org.
**MSD Members**

**Brian Galinat, MD, MBA** was elected as an associate member of the American Shoulder and Elbow Surgeons. Dr. Galinat is Chair of the Department of Orthopaedic Surgery at Christiana Care Health System.

**Robert J. Laskowski, MD, MBA** was honored by the Arthritis Foundation at its annual Delaware Bone Bash in October for his commitment to improving the musculoskeletal health of the community. Dr. Laskowski retired as President and CEO of Christiana Care Health System.

**Nicholas J. Petrelli, MD, FACS** received the 2014 Clinical Research Award from the Association of Community Cancer Centers in October in recognition of his ground-breaking leadership initiatives promoting and advocating for oncology clinical research. Dr. Petrelli is the Bank of America Endowed Medical Director of Christiana Care's Helen F. Graham Cancer Center and Research Institute.

**Velma Scantlebury, MD, FACS** was honored at the 50th Annual Wilmington NAACP Freedom Fund Awards Banquet. Dr. Scantlebury is the associate director of the Kidney Transplant Program at Christiana Care Health System.

**Kenneth L. Silverstein, MD, MBA** has been appointed Chief Medical Officer of Christiana Care Health System. Prior to his most recent appointment, Dr. Silverstein was Chair of the Department of Anesthesiology and Medical Director of Perioperative Services at Christiana Care.

**Hospitals**

**Bayhealth Kent General Hospital** earned designation as a Baby-Friendly Hospital. The initiative encourages and recognizes hospitals and birthing centers that offer optimal levels of care for breast feeding mothers and their babies.

**Beebe Healthcare** was recognized as a "Leader in LGBT Healthcare Equality" by the Human Rights Campaign Foundation. The health system earned top marks in meeting non-discrimination and training criteria that demonstrate its commitment to equitable, inclusive care for LGBT patients and their families.

**Christiana Care Health System’s Center for Advanced Joint Replacement** earned The Joint Commission's Gold Seal of Approval for its hip and knee replacement programs by demonstrating compliance with national standards for health care quality and safety in disease-specific care.

The National Cancer Institute has selected **Christiana Care Health System's Helen F. Graham Cancer Center and Research Institute** to join its Community Oncology Research Program.

**Nanticoke Health Services** received the American College of Cardiology’s NCDR ACTION Registry Get With The Guidelines Silver Performance Achievement Award for 2014. The award recognizes Nanticoke's commitment and success in treating heart attack patients to levels of care outlined by the American College of Cardiology/American Heart Association clinical guidelines and recommendations.

**The Nemours Center for Cancer and Blood Disorders,** in collaboration with Delaware State University, has received a $10.2 million five-year grant from the National Institutes of Health to study genetic mutation that causes sickle cell disease and to improve care and outcomes for affected children.

**Nemours Health and Prevention Services** will receive $1.8 million over three years to promote healthy eating and physical activity in targeted communities in Wilmington and New Castle County. The award is part of the U.S. Department of Health and Human Services Partnership to Improve Community Health initiative to support public health efforts to reduce chronic diseases, promote healthier lifestyles, reduce health disparities, and control health care spending.

**Saint Francis Healthcare's** parent organization announced that it is now Trinity Health and revealed a new branding identity and strategy for the system that emphasizes a people-centered approach to its service to individuals and communities.