



SAVING LIVES - REDUCING RISK

## Do You or Your Physicians Feel Vulnerable Documenting on an EMR?

### TSG Has a Solution: RSQ® Assist

Many Emergency Medicine physicians are being forced to use an EMR that does not support their clinical practice or include **TSG's Risk Mitigation Module**. In response to their frustration, TSG has redesigned its clinical decision support library that is currently installed in over 400 EDs to create **RSQ® Assist**.



The patented **RSQ® Assist** application is a free-standing, complaint-specific clinical decision support tool that assists providers in their clinical practice and documentation. Drawing from 20 years of research into adverse events

and an analysis of 350,000 high-risk patients, TSG developed an application that is tailored to fit the Emergency Medicine practitioner's workflow. ■

**Learn More at Booth # 1220  
ACEP Scientific Assembly**

Contact Brant Roth: [broth@thesullivangroup.com](mailto:broth@thesullivangroup.com)

### RSQ® Assist Includes:

- ✓ Over 125 Quick Consults, including key information regarding history, physical exam, graphics, current evidence-based medicine, risk stratification tools
- ✓ Interactive Differential Diagnosis program
- ✓ Thousands of graphics depicting normal and abnormal anatomy, procedures and easily forgotten elements of the physical examination
- ✓ Comprehensive EM Clinical Calculator program
- ✓ A Dictation Template program with built-in Clinical Decision Support
- ✓ A Discharge Time-Out program
- ✓ Thousands of risk, safety and quality alerts and reminders. ■



SAVING LIVES - REDUCING RISK

## From The Editor

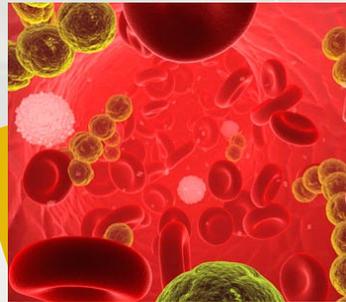
Necrotizing fasciitis has been in the news lately. This is a devastating disease that can be incredibly difficult to diagnose. The first presentation is often nothing more than extremity pain that looks very much like garden-variety musculoskeletal discomfort. There may be few or zero clues that a more dangerous process is underway. By the time the diagnosis is made, the disease process is often too far

along to reverse it, resulting in severe morbidity and mortality.

Necrotizing fasciitis is an uncommon but lethal infection. The condition usually occurs in the extremities and may evolve after minimal or no local trauma. There are two types of infections:

1) The first is polymicrobial, involving non-group A strep plus anaerobes. These infec-

tions typically involve the abdomen and perineum. 2) The failure-to-diagnose cases often involve the second, which includes group A beta-hemolytic strep. It is most often on the extremities; TSG case review indicates that it may also involve the neck.



There are some clues that may aid in diagnosis; a review of several necrotizing fasciitis cases is helpful in understanding what those clues might be. In addition, TSG is adding a necrotizing fasciitis module and rules in our Electronic Medical Record Risk Mitigation Module. Real time clinical decision support can be a great aid in helping practitioners consider an appropriate differential diagnosis. ■

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## Great News

The American Board of Emergency Medicine (**ABEM**) has affirmed that the TSG **RSQ<sup>®</sup> Clinical Assessment** (EMRI Audit) can be used by ABEM certified physicians toward fulfillment of a current ABEM Maintenance of Certification of Practice Performance (APP) – Practice Improvement (PI) requirement.

*“Physicians certified by the American Board of Emergency Medicine may satisfy one current Assessment of Practice Performance requirement by completing this activity.”*

If you practice at one of the 400 EDs that currently use the **RSQ<sup>®</sup> Clinical Assessment** (EMRI Audit), please contact TSG or ABEM to learn more about how this activity meets the Assessment of Practice Performance Maintenance of Certification requirement.

If you are interested in implementing the **RSQ<sup>®</sup> Clinical Assessment** at your facility, please contact Brant Roth for more details.

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ABEM  
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## Case #1

### ED Visit #1, Day 1

A 38-year-old man presented to the emergency department with a complaint of left foot pain.

#### Triage Vitals:

| BP       | Temp           | Pulse | Resp |
|----------|----------------|-------|------|
| 124 / 76 | 100.4°F (38°C) | 116   | 20   |

**Chief Complaint:** Pain top of left foot since this morning. No apparent injury. No medications. No significant past medical history. The nursing primary assessment was complete and included a skin assessment of “Warm, dry, normal.”

The physician dictated his history and physical exam.

**Chief Complaint:** Left foot pain, no apparent injury.

**HPI:** 36-year-old male with pain along the sole of his foot starting last night, worse today. Walking is exquisitely painful. Patient thought this might be a circulatory problem but recalls he was not injured. He did not twist or in any way hurt his foot. On his feet a great deal during work.

**Relevant Physical Exam:** “Extremities: The foot is exquisitely tender along the plantar fascia starting at the heel, ending at the head of the metatarsals.” X-Ray negative for fracture.



**Meet Members of our RSQ® Advisory Board at the upcoming trade shows**



**Obstetrics**  
*Henry Lerner, MD*

ASHRM, Booth #601



**Patient Safety & Risk Management**  
*Arnie Mackles, MD, MBA, LHRM*

ASHRM, Booth #601



**Patient Satisfaction**  
*Doug Finefrock, DO*

ACEP, Booth #1220



**Toxicology**  
*Leon Gussow, MD*

ACEP, Booth #1220

**ED Course:** The emergency physician diagnosed "Plantar Fasciitis." He ordered taping of the foot, crutches, ice, elevation, and anti-inflammatory medication. The patient was discharged with follow-up with his primary care physician in 2 days. He was discharged with the same vital signs; there had been no repeat. He went home with a documented pulse of 116.

**Office Follow-Up, Day 3**

During the office visit two days later, the nurse noted that the patient had severe swelling of his left foot and ankle with pain radiating up to the knee. BP was 114/80; Pulse 136.

The primary care physician noted the prior history with progressive worsening. Repeat X-ray was negative. Pain increasing with swelling in the left foot, and patient cannot bear weight secondary to the pain.

**On Physical Exam:** "Marked swelling of the left foot with decreased range of motion secondary to pain. No warmth or redness observed. Pulse rates are good. Repeat X-Ray reveals no fracture."

**Diagnosis:** Left ankle sprain.

**Plan:** Elevation. Tylenol #3, air cast, return visit in 1 week.

**ED Visit #2, Day 4**

The patient returned to the same ED on day 4 complaining of redness and swelling to the left foot and ankle.

### Triage Vitals:

| BP       | Temp            | Pulse | Resp |
|----------|-----------------|-------|------|
| 110 / 64 | 98.1°F (36.7°C) | 144   | 28   |

**Chief Complaint:** Left foot to knee pain and swelling for 5 days. Saw PMD, diagnosed ankle sprain. Called PMD yesterday and was started on an antibiotic.

**Emergency Physician Evaluation:** The patient was markedly diaphoretic. There was marked edema, erythema, and increased warmth to touch from the toes to the knee. There were large confluent vesicles over the dorsal and lateral aspect of his left foot and hemorrhagic vesicles on the lateral aspect of the foot.

WBC was 42,000. The patient was admitted with a diagnosis of cellulitis. The emergency physician started Ceftriaxone in the ED, 2 grams IVPB.

**Hospital Admission Summary:** The patient was seen by surgery and infectious disease. They agreed that the patient had necrotizing fasciitis and compartment syndrome. He underwent debridement and irrigation of the

### e-Learning Topics

#### Patient Safety & Risk Management

- 11 Simple Strategies to Prevent Medication Errors
- Communication Strategies to Improve Patient Safety in High-Risk Situations
- Essentials of Patient Safety
- Technology Revolution: Improving Patient Safety, Reducing Liability

#### Patient Satisfaction

- Best Practices for High-Risk Patients in a Hospital Setting
- Best Practices for High-Risk Patients in an Office Setting
- Introduction to Best Practices for All Healthcare Providers

#### Toxicology

- Gastrointestinal Decontamination in Toxic Ingestion
- Opiate Agonists & Antagonists

*click on the course name to see the course description*

left leg and foot, decompression, and fasciotomy. The wounds improved. Cultures showed Streptococcus Group A. Blood culture test results were negative. The patient had a second operation for definitive debridement.

## Case Discussion

### ED Visit, Day 1

Could the diagnosis have been made or should it have been considered on Day 1? What clues could have led to consideration of necrotizing fasciitis?

1. The patient had severe pain that was out of proportion to mechanism of injury; in fact, there was no injury. The physician actually made specific mention of the fact that there was no mechanism of injury.
2. The patient was febrile. Fever plus pain out of proportion to mechanism of injury could put necrotizing fasciitis in the differential.
3. **Key Point:** 🗝️ The patient had a heart rate that was significantly out of proportion to the body temperature. This is called pulse-temperature disparity and is often a key indicator of early sepsis.
4. **Key Point:** 🗝️ The patient came in with tachycardia and went home with tachycardia. Repeat vitals may have demon-

strated pulse normalization or worsening tachycardia. The failure to repeat vitals was a medical error.

There was extreme tenderness on the plantar aspect of the left foot over the plantar fascia. Was it a breach in the standard of care to fail to diagnose sepsis following the history and physical exam? Arguably, it was not. Was it possible to recognize that something significant was happening and the patient needed further testing or consultation? Arguably, yes.

The first visit simply did not add up to fasciitis. Like most cases involving medical error and adverse outcomes, this was not a difficult case. Practitioners must recognize that



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pulse rate abnormalities reflect dramatic physiologic changes. Plantar fasciitis would not have increased this man's pulse rate by 50 beats/min.

Look at the common threads from this and other cases of fasciitis:

1. There is often no visually apparent site of infection.
2. There is usually a vital sign indication reflecting a significant physiologic abnormality.
3. There is often pain or a symptom out of proportion to mechanism of injury.
4. Onset is often minutes to hours.
5. There is often minor trauma to the area.
6. The physician's diagnosis does not connect the dots with a diagnosis that explains the presentation.

## TSG Upcoming Lectures

by Dan Sullivan, MD, JD, FACEP

### ASHRM Conference

- 1 **EM Trends: Claims & Risk Mgmt.**  
Mon., Oct. 8 @ 10:15 a.m.

### ACEP Scientific Assembly

- 1 **Medical-Legal Risks in Times of Everyday Crisis**  
Wed., Oct. 10 @ 1:30 p.m.
- 2 **Case-Based High-Risk Bounce Backs**  
Wed., Oct. 10 @ 5:00 p.m.
- 3 **Medical Liability in the Age of Electronic Health Records**  
Thur., Oct. 11 @ 8:00 a.m.

**Bottom Line:** What should have happened during this first visit? Standard of care aside, this emergency physician should have recognized the physiologic abnormality and observed the patient over a period of hours, considered diagnostics, or requested a con-

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sultation. The physician should have considered infection in the differential diagnosis. The nurses should have repeated vital signs according to department protocol and should have alerted the emergency physician that he was discharging a patient with abnormal vital signs.

What should have happened during the office visit? The primary care physician should have recognized that the pulse rate of almost 140 beats/min was dramatically abnormal. He also should have recognized that plantar fasciitis does not somehow morph into a sprained ankle. When considered together, those two facts must indicate that something more serious was occurring.

## Case #2

A 55-year-old man presents to the emergency department with pain in the area of the right scapula.

### Triage Vitals:

| BP      | Temp      | Pulse | Resp | Pulse Ox |
|---------|-----------|-------|------|----------|
| 90 / 70 | Not taken | 125   | 16   | 100% RA  |

**Chief Complaint:** Right upper back pain, cannot raise right arm. Injured himself at work 3 days ago. Box fell on shoulder. Pain began this morning.

**Nurse Assessment:** The primary nurse assessment was documented on an electronic medical record.

No allergies. No significant past medical history. History of present illness: Right upper back hurting; work involves lifting 25-pound boxes repeatedly. The review of systems was completely normal. Acuity Classification: Nonurgent. Orientation: Times 4. LOC: Awake and alert. Skin: Dry, color normal. Breath Sounds: Rales, equal bilaterally. Abdomen: Flat. Duration: 3 days.

## Emergency Physician History and Physical Examination

The emergency physician documented the patient's history on a commercially available medical template.

**History of Present Illness:** 55-year-old male with injury to right arm and shoulder. Three days ago at work. Pain became severe today. Lifts heavy objects at work, box fell on shoulder. Pain is mild, 7 out of 10. No associated symptoms.

**Review of Systems:** Negative.

**Past History:** Negative. No allergies.

The emergency physician indicated that the nursing history and vital signs were reviewed.



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## Physical Examination

**Hands:** Normal.

**Wrist:** Normal.

**Forearm and Elbow:** All normal.

**Arm and Shoulder:** Normal inspection, nontender, normal range of motion.

**Graphic of Pain:** Area over right scapula filled in indicating the location of pain. Writing next to it indicates mild tenderness, muscle spasm.

**Neurologic, Vascular, Tendon:** Sensation intact, no vascular compromise, tendon function normal.

**Skin:** Warm and dry.

**ED Course:** Chest and shoulder X-rays normal. Treated with Toradol 60 mg IM and Norflex IM.

**Clinical Impression:** Muscle Spasm.

**Discharge Instructions:** Flexeril 10 mg BID. Moist heat to the painful area. No work until follow-up with PMD. Follow up with PMD in 2 days. Ibuprofen 800 TID for pain.



There are no further nursing notes, no progress notes, and no additional vital signs documented.

## ED Visit #2

The patient returned to the same emergency department 2 days later. On awakening that morning, the patient was unable to walk. He had an abnormal mental status. The family called 911. The patient was talking in the ambulance. On arrival to the emergency department he was placed into a stretcher space. The primary nurse obtained the following vital signs:

| BP       | Temp            | Pulse | Resp |
|----------|-----------------|-------|------|
| 110 / 64 | 98.1°F (36.7°C) | 144   | 28   |

Five minutes later and before any further evaluation, the patient went into complete arrest and could not be resuscitated.

**Autopsy Result - Final Pathologic Diagnosis:** Sepsis secondary to cellulitis of the right upper back and arm. Cellulitis of the right upper back with skin sloughage and focal extension into the underlying musculature. Hemorrhagic necrosis and subcutaneous emphysema. Necrotizing fasciitis and multi-organ failure.

## Case Discussion

There are several problems in this particular case. The nurse never took an initial temperature. Although ultimately an issue for the jury, this is probably a breach in the stan-



dards of nursing care. In fact, it turned out to be a huge issue for the hospital in the subsequent litigation.

The initial pulse rate was 125 beats/min. This is probably 60 beats/min over the patient's resting normal pulse rate. Imagine the physiologic changes that must have been occurring to cause this elevation. This type of finding is often overlooked by both nursing and medical practitioners. The emergency physician has an obligation to recognize this finding as severely abnormal. The nurse has an obligation to recognize this as abnormal. If a patient is about to be discharged and the only pulse rate on the chart is 125 beats/min with a diagnosis of muscle strain, the nurse should alert the emergency physician regarding the pulse rate abnormality.

The blood pressure during the first emergency department visit was 90/70; this isn't technically hypotensive, but certainly a matter of concern in a 55-year-old man. The emergency department team had an obligation to repeat and monitor the patient's blood pressure.

What clues would tip you off to the presence of early sepsis in this case?

1. The elevated pulse rate.
2. The relatively low blood pressure.
3. The fact that something hit the patient's shoulder. His shoulder examination was

completely normal and the pain was elsewhere. There was 7/10 pain over the scapula. The injury occurred 3 days prior, but became very severe on the day of the emergency department visit.

4. When taken all together, this does not add up to muscle strain. Consider sepsis in the differential diagnosis.



**Editor's Note:** *These cases clearly demonstrate that the practitioner often gets only one chance to piece together the subtle clues that suggest necrotizing fasciitis and sepsis. The organisms that cause necrotizing fasciitis usually cause a rapidly progressive process. The office and emergency practitioners are often faced with early necrotizing fasciitis, before the source of infection has clearly declared itself. By the time these patients present to the emergency department, it is often too late. End-organ injury is complete; morbidity and mortality is dramatic.*

Look up sepsis and necrotizing fasciitis in medical textbooks. They describe a diagnosis process and how to manage it as though it were already present. They don't describe these earliest moments when piecing together key clinical findings means the difference between life and death.

These cases demonstrate the beginnings of the necrotizing fasciitis process:



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or pain significantly out of proportion to mechanism.

- Pain out of proportion to mechanism, no mechanism at all or a mechanism that does not make sense
- Pulse rate out of proportion to body temperature
- Blood pressures at the lower limits of normal
- Diagnoses that do not match the presentation.
- Relatively rapid onset

**RSQ® Solutions for Obstetrics**

TSG has now completed a full risk, safety and quality program in Obstetrics under the leadership of Dr. Henry Lerner, VP Obstetrics Safety Solutions.

Green RJ, Dafoe DC, Raffin TA. Necrotizing fasciitis. *Chest*. 1996; 110:219.

Donaldson PM, Naylor B, Lowe JW, Gouldsbrough DR. Rapidly fatal necrotising fasciitis caused by *Streptococcus pyogenes*. *J Clin Pathol*. 1993; 46:617.

Wong CH, et al. Necrotizing fasciitis: Clinical presentation, microbiology, and determinants of mortality. *J Bone Joint Surg Am*. 2003; 85:1454.

Golger A, et al. Mortality in patients with necrotizing fasciitis. *Plast Reconstr Surg*. 2007; 119:1803.

Spach DH. Cellulitis and necrotizing soft tissue infections. *Curr Pract Med*. 1999; 2:545.

Although we have several additional cases that could be included in this newsletter, these two cases should serve to make the key points. (There are additional cases in the Sepsis courses in the TSG online library.) It is absolutely key to make this diagnosis early. In two decades of case review, we have yet to find an alleged failure to diagnose necrotizing fasciitis that did not demonstrate early abnormal physiology



The program includes online education for physicians, a comprehensive fetal heart tone program for nurses, a first-of-its-kind clinical performance evaluation, a unique, time-efficient simulation and a placental pathology program. ■

Urschel JD. Necrotizing soft tissue infections. *Postgrad Med J*. 1999; 75:645.

Anaya DA, Dellinger EP. Necrotizing soft-tissue infection: Diagnosis and management. *Clin Infect Dis*. 2007; 44:705.

Perry BN, Floyd III WE. Gas gangrene and necrotizing fasciitis in the upper extremity. *J Surg Orthop Adv*. 2004; 13:57.

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