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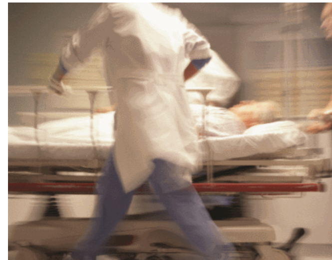
Feature: IR in the ER

The key role IR plays on the trauma team

BY SUSAN ROSE FALL 2017



On the morning of June 14, 2017, people around the country heard news of a shooting in Alexandria, Virginia, at the Republican baseball team practice for the annual Congressional Baseball Game for Charity, a bipartisan event scheduled for the following day.

Approximately 25 Republican members of Congress, along with staffers, lobbyists and Capitol police, were at the ballpark that morning when a gunman opened fire. After a 10-minute shootout with the Capitol and Alexandria police, the shooter was dead and five others were severely wounded, including House Majority Whip Steve Scalise. Witnesses say that the quick actions of the Capitol Police, there as Rep. Scalise's security detail, helped save lives with their quick response.

Level 1 trauma centers prepare

At MedStar Washington Hospital Center and the George Washington University Hospital, it was the beginning of a routine day for the trauma team—at least as routine as any day is in trauma.

As soon as the 911 call came in, members of both hospitals' trauma teams sprang into action, not knowing what to expect and preparing for the worst.

Arshad A. Khan, MD, FSIR, the senior interventional radiology staff physician at MedStar, was the trauma team IR on duty that morning when the IR team was informed that there had been a mass shooting and that they should prepare the IR suites for patients. Around 8:15 a.m., the trauma surgical team alerted IR that they may need to bring a patient to IR for possible embolization.

> **The collaboration between surgeons and interventional radiologists has been at the center of many great advancements in trauma care.**
>
> *— Jack Sava, MD, FACS, Director of Trauma/burns Program Director, General Surgery, MedStar Washington Hospital Center*

The IR team still did not know details about the incident other than what they had heard on the news. They were simply following the normal protocol for gunshot trauma. They didn't know who the patient was, even when the Capitol police secured the radiology suite.

MedStar Director of Trauma/burns and Program Director, General Surgery, Jack Sava, MD, FACS, and his team escorted the patient to IR. Dr. Sava later described the patient's condition as "critical with an imminent risk of death." That patient was Rep. Scalise.

According to Dr. Khan, there are typically four or five people in the room during a trauma case: the IR, a nurse and a tech, the trauma resident, and one of the trauma nurses. "That day the room was full," he said. "There were three trauma attendings, which is rare because they are typically addressing other situations in the OR. There were also a few surgical residents and two anesthesia attendings, and my partner was sitting outside the room."

However, the number of personnel and level of security were the only things different about this case.

"I've been on a trauma team for 17 years and done hundreds of embolizations. Once I started working, everyone else in the room disappeared and it was the trauma team doing what we do best," Dr. Khan said. "It was a routine day in IR and any interventional radiologist would have done the same thing that I was able to do. I have no doubt about that."

Every day, the medical professionals on a trauma team work together to save lives, and that day was no exception.

The role of IR on the trauma team

When stories like this appear on the news and the trauma surgeons speak to the press, the public may not be aware of how many specialists are involved with the trauma team—and how critical they are. But the surgeons—and everyone else on the team—know full well.

According to Dr. Sava, "You can't really deliver top-level trauma care without a great IR team. The collaboration between surgeons and interventional radiologists has been at the center of many great advancements in trauma care."

Dr. Sava adds that much of complex trauma care requires close collaboration between surgeons and interventional radiologists. The patient may go to the operating room first for major bleeding control, then to IR for management of vessels that are harder to reach. In other cases, patients may start with IR and then move to the OR. Sometimes, they actually work at the same time. It is a close relationship in which everyone is working together to tailor a treatment plan to the patient—often when moments matter in the fight for life.

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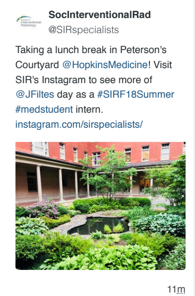

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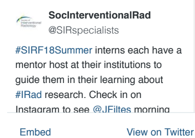

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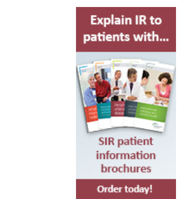
Explain IR to patients with...



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In the case of Rep. Scalise, the life-threatening wound was common of that type of high-velocity shot to the pelvic region. The bullet traveled across the pelvis and through blood vessels, making bleeding the top concern. The congressman first went to surgery for blood transfusions for the ongoing hemorrhage from multiple locations. He then went to IR, where Dr. Khan performed the embolization.

Dr. Khan says this was typical of any gun shot, knife wound or motor vehicle accident in which the patient is bleeding inside the pelvis. The OR team stabilizes the other injuries and then brings the patient to IR to stop the bleeding. "In extensive traumatic pelvic bleeding, the vast majority of patients benefit from IR embolization techniques," he said. "This is our expertise."

Charles Burke, MD, FSIR, vice chair, interventional services, and division chief, interventional radiology, at UNC Center for Heart and Vascular Care concurs. He says trauma care is truly a team effort in which each practitioner's unique skill set can save a life.

"Patients presenting with pelvic trauma and significant bleeding are a real challenge for a trauma surgeon to manage in the OR. But for IRs, these are typically straightforward cases where the bleeding can often be managed in a matter of minutes," he said.

IR is one cog in the wheel of a big team—each person plays an important role in the patient's treatment. We all respect and value each person on the team and their unique contribution.

— Darryl Zuckerman, MD, FSIR, FACR, Member of the trauma team at Barnes-Jewish Hospital in St. Louis

The life of a trauma IR

What does a normal day look like for a trauma IR? Dr. Khan says there are not usually so many police and people in the suite for one. In fact, most often the IR trauma team performs its procedures at 2 a.m.—when most shootings, stabbings and car accidents happen. The hospital is relatively quiet at that hour. The team is called in, they perform the procedure, then go back home to bed, often without seeing many other people in the hospital halls.

When on call, any member of the trauma team must be no farther than half an hour away from the hospital—that is in fact a requirement of the Level 1 trauma center certification. It's a difficult lifestyle.

What is exciting, says Dr. Khan, is that you are literally saving a life. Each minute matters for the patient and the IR must act fast, using his or her experience and knowledge to make quick decisions that may later impact the patient's lifestyle.

Darryl Zuckerman, MD, FSIR, section of vascular and interventional radiology at the Mallinckrodt Institute of Radiology, Washington University School of Medicine, and a member of the trauma team at Barnes-Jewish Hospital in St. Louis, adds that the trauma IR is treating an otherwise healthy patient, often in the prime of life, who is literally dying. "The patients have the vast majority of their life ahead of them. We do a huge service for these patients and watching them leave the hospital is immensely gratifying," he said. "The gratification of saving a life, of doing a procedure and immediately seeing the impact on the patient, makes all of those late-night calls worthwhile."

Dr. Burke has practiced trauma IR for 15 years and says he has always found professional satisfaction in the procedural aspect of it, reiterating that these are often life-and-death cases where IRs have an opportunity to make an immediate difference. He remembers one case in particular from his residency: he was assisting on an embolization in a patient with a traumatic liver laceration. The patient was hypotensive on multiple pressors, and they quickly found massive hemorrhage from the right hepatic artery and just as rapidly embolized it.

"What impressed me most was how soon the patient responded. It seemed like the patient went from hypotensive and unstable to normotensive and stable within seconds. The fact that our actions played a major role in this patient surviving and eventually being able to leave the hospital made quite an impression on me," he said.

Establishing IR on the trauma team

What can an IR do if there is not currently an interventional radiology role on the trauma team? Dr. Burke says it first requires ensuring that adequate resources are in place. For example, trauma cases often occur in the middle of the night and require immediate response. The IR group must establish procedures to ensure it can provide these services 24/7.

Once the infrastructure is in place, he says developing a trauma service is like building any other successful program: it requires reaching out and forming multidisciplinary collaborations with the relevant specialties. For trauma, this means meeting with trauma surgery, orthopedic surgery and emergency medicine. If there is a formal multidisciplinary group in the hospital, such as a trauma committee, that meets regularly to develop protocols for patient management or review workflow issues, ask to attend the meetings.

Arshad Khan, MD, FSIR, describes his experience as an IR on a trauma team.

Dr. Burke suggests beginning by promoting procedures where IR has a clear advantage over the other specialties, such as pelvic fracture and intra-abdominal solid organ hemorrhage where embolization is now included in the standard of care.

Finally, he suggests being prepared with evidence-based support to include IR services in the algorithms.

How to become a trauma IR

"IR is an exciting and evolving specialty, particularly well-suited for those who are procedurally oriented," said Dr. Burke. "This can sometimes be difficult to know early in one's training."

Looking for research opportunities to gain a more in-depth understanding of what happens in trauma and taking IR electives in other institutions to get a more complete and well-rounded experience is also useful. But ultimately, the only way to truly decide if trauma IR is a good fit is to experience it first-hand.

Dr. Zuckerman suggests doing a surgical internship prior to embarking on a radiology residency to learn the clinical approach to multitrauma in the ER, gain exposure to the different specialist involved and see how it all works together.

If a student's goal is to become a trauma IR, Dr. Khan says nothing beats doing a fellowship in a Level 1 trauma center. There you will sharpen your analytical problem-solving skills while learning the most common tools and gain extensive experience with the most common trauma procedures, namely balloon occlusion, transarterial embolization and stent-grafts.

"While these are skills any IR will possess, the difference in trauma is how fast the IR must act. That ability comes with practice. Lots of practice," said Dr. Khan.

If you are already a practicing IR and want to get involved with trauma, the advice is to build relationships, the same as establishing an IR group on the trauma team. It's worth keeping in mind that academic institutions are more likely already level 1 centers. Dr. Khan also suggests taking advantage of hands-on training, such as the trauma workshops available at the SIR annual meeting.

Visit the website of the American Trauma Society for an interactive map of trauma centers in the United States.

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