



# Management<sup>®</sup>

*The monthly update on Emergency Department Management*



## Want to improve quality of care and ease the burdens on your physicians?

*Emergency departments discover hospitalists are a secret weapon*

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- *ED Accreditation Update*

**W**hile you're waiting for three physicians to return your calls about their patients in your ED, you anxiously watch the clock and realize that if they don't call before leaving the office, they aren't likely to call until tomorrow. Don't you have enough to worry about without trying to track down dozens of physicians all the time?

Some hospitals have decided ED managers can be more efficient — and patients will benefit — if in-house physicians can handle much of the daily care of patients in the ED and beyond. Hospitalists increasingly are coming to the rescue, and ED managers welcome them with open arms.

Unlike most other physicians, hospitalists can care for a wide range of patients within the hospital and continue with a patient for long periods. By being available around the clock, hospitalists are able to attend to a patient's changing condition as it occurs, proponents say, rather than having care delayed until the primary care physician can arrive.

Hospitalists complement the practice of emergency physicians by focusing timely attention on admitted patients, says **James J. Augustine**, MD, FACEP, vice chair of clinical operations in the department of emergency medicine at Emory University in Atlanta, and director of clinical operations at EMP, a physicians group based in Canton, OH. He says the use of hospitalists is growing across the

### Executive Summary

Hospitalists are becoming increasingly common in U.S. hospitals, and EDs are among the biggest beneficiaries of their improved efficiency.

- Hospitalists reduce the amount of time ED staff spend trying to reach private physicians by phone.
- They can help improve patient flow through by shortening length of stay and freeing hospital beds.
- Adopting a hospitalist program is a major endeavor for any hospital, but ED managers can help encourage the change.

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country and promises substantial benefits to EDs in particular.

“Hospitalists benefit the patient by rapidly directing the work-up and treatment, the same goals as emergency physicians,” he says. “Efficient movement of patients through evaluation and treatment and back to the outpatient setting will make the hospitalist group successful, just like the ED group.”

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One of the most tangible benefits to EDs is that the hospitalist presence in the hospital keeps the ED physicians or managers from making long series of calls to community-based physicians, the same physicians who are so busy making their outpatient offices work efficiently, Augustine says. The hospitalist then arranges appropriate consults and works quickly to begin arrangements for dismissal of the patient.

“The ED physicians and the hospitalist group often use a very collaborative approach to the design and implementation of care protocols,” he notes. “These protocols encourage time and cost-efficient work-up and treatment, and lower the length of stay for many inpatients. Collaborative inpatient management is also good risk management practice for both groups.”

Hospitalists also can improve patient satisfaction by speeding patient management, he says.

### **Help standardize inpatient care**

Providers are adopting the hospitalist model at a rapid pace, and EDs can be a primary beneficiary, says **Ron Greeno, MD**, chief medical officer and senior vice president of physician services at Irvine, CA-based Cogent Healthcare, one of several companies that provide hospitalist services across the country. The system of hospitalists is very different from the traditional model of primary care physicians coming to the hospital to care for individual patients.

“Every hospital I’ve ever worked in has had the goal of trying to standardize care given by physicians within the walls of the hospital,” Greeno says. “The first big obstacle is the sheer numbers. With 400 physicians giving care, and most only spending small parts of the day in the hospital, they’re much more concerned with their private practice than your hospital goals. The second obstacle is the way physicians are paid.”

The typical payment system for physicians provides “a reverse incentive” for speedy care, because they are paid more money when the patient stays in the hospital longer and more treatment is provided, he explains. That is a direct conflict with hospitals, which are paid a flat rate based on diagnosis, motivating their clinicians to get the patients out as quickly as possible. **(For more on the prevalence and benefits of hospitalists, see box, p. 51.)**

### **ED reaps benefits of hospitalist program**

The recent arrival of hospitalists has been a boon to Brookhaven Memorial Hospital Medical Center in East Patchogue, NY, says **Paolo Coppola, MD**, ED director.

“The Cogent [Healthcare] hospitalists have made a

significant difference in the efficiency of the emergency department in our hospital," he says. "The emergency physicians no longer have to wait for the doctor on call to come in to admit a patient after or before their office hours or in the middle of the night. This was very taxing for the doctors and inconvenient for everyone, especially the patients who had to wait to be seen."

Coppola says Brookhaven adopted hospitalists about a year ago, and predictably, there was some resistance from physicians who felt threatened by the new system. But it didn't take long for them to realize that hospitalists take a lot of pressure off other physicians, usually in the form of uninsured patients and others who aren't highly reimbursed.

Once the hospitalists admit the patients, patients begin their program of care under the hospitalist team, and the emergency physicians can turn their attention to the new patients presenting in the ED, Coppola says. About 20% of patients coming through his ED go to the hospitalist service, which has four hospitalists on staff.

"The hospitalist physicians really have become valuable members of our team," he adds. "They have been a huge help with improving the flow of the patient in the ED, definitely."

### ***Hospitalists more available to ED***

One reason for the improved patient flow in the ED is that it is easier for ED staff to get to know one group of hospitalists rather than 120 physicians on call, Coppola says. Thus, they work more cohesively and quickly as a team, he says. Another reason is that hospitalists are much more available because they are not dividing their time between hospital rounds, office hours, and other demands.

"Every minute counts. If you're waiting 20 minutes for a doctor to return your page, multiplied by 15 admissions that day, that's a lot of time wasted," he says. "With hospitalists, I can call him up, and he actually picks up the phone."

The lead hospitalist at Brookhaven, **Sayed Syed**, MD, FACP, FRCP, says the use of hospitalists has helped the facility shorten length of stay and increase bed turnover. No specific figures for the improvements are available yet because the program is just 1 year old.

"The hospitalists help reduce length of stay for inpatients, and that in turn helps the ED move patients out faster," he says. "The patients who are staying in the ED for two days waiting for a bed can get moved out much faster. And we are available all day here, so we can change the patient's condition whenever it is

## **Hospitalist use increases: What is the benefit for EDs?**

**H**ospitalists are becoming much more common in American health care and soon could change the way EDs work with physicians, says **Ron Greeno**, MD, chief medical officer and senior vice president of physician services at Cogent Healthcare in Laguna Hills, CA, one of several companies that provide hospitalist services across the country.

"I say that in five years, every hospital will have a hospitalist program in it," he predicts.

There are between 7,000 and 9,000 hospitalists practicing in the United States, Cogent reports. That number is expected to grow to about 25,000 by 2010, the company estimates.

One study found that hospitalists can significantly improve patient care.<sup>1</sup> The researchers originally described the hospitalist model of inpatient care in 1996, and they later reported on the clinical, financial, educational, and policy implications of the trend. They found that implementation of hospitalist programs was associated with significant reductions in resource use, usually measured as hospital costs (average decrease, 13.4%) or average length of stay (average decrease, 16.6%).

But even if the potential benefits for patients and hospitals are huge, won't your current physician base rebel at the idea of hospital-employed physicians taking over? Not necessarily. In fact, Greeno says doctors often are relieved that they can turn over some patient care.

"It's usually not traumatic for physicians already treating patients in your hospital, but some medical staff are ready for this and some are not," he says. "You can't just take patients away from medical staff, so the staff has to be ready to say, 'We'll let hospitalists take unassigned patients from the ED,' for instance. A lot of them gladly will turn over their patients to the hospitalist and stay in their offices."

### ***Reference***

1. Wachter RM, Goldman L. The hospitalist movement 5 years later. *JAMA* 2002; 287:487-494. ■

appropriate. We can downgrade a patient to a regular unit at 3 a.m. instead of waiting for another doctor's rounds the next morning, and that opens up that intensive care bed."

Syed says ED managers usually are some of the strongest supporters of hospitalist programs because they see the benefits so directly. But how do you go about getting hospitalists in your facility? Well, don't

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think you can do it on your own. Adopting a hospitalist program is a major endeavor for any hospital, and you're going to need the support of the medical staff to make it happen.

"An ED manager coming up with this idea isn't going to be persuasive enough to make it happen, but the medical staff can have a lot of influence if you get them on your side," Coppola says.

"Plant that bug in the ear of the medical staff, and show them how much they can benefit because they're not going to be called in the middle of the night as much and they're going to have more time for office hours. Once they get excited about it, the idea can move forward," he adds. ■

## Want to improve service? Promise a 30-minute wait

Even if you don't want to offer a service guarantee like those EDs that promise to treat patients in 30 minutes or less, you probably wouldn't mind streamlining your ED and improving patient flow through. So how do those hospitals promising fast service improve their EDs enough to make that promise possible?

At St. Charles Mercy Hospital in Oregon, OH, a "30-minute ED promise" required significant improvements in ED operations, says **Dayle Pugh**, RN, BSN, CEN, clinical director for emergency services.

The hospital promises that patients will be seen by a physician within 30 minutes of entering the ED, she says. If the ED fails to make that time limit, the patient is offered a \$15 gift certificate to a local

restaurant or department store.

Triage processes were revised in the biggest single change, and in the end, operations were improved enough that left-without-being-seen statistics went from 0.74% to 0.25%.

"Triage was where we captured the majority of our time savings. We have a lot of parallel processes now with a quick registration process," Pugh explains. "We also changed our triage process from a very thorough one to a much shorter one." **(For more on the new "mini-triage" system, see box, p. 53.)**

The same 30-minute promise is offered at St. Anne Mercy Hospital, a sister facility in Toledo, where **Kenneth Chelucci**, MD, FACEP, medical director of emergency services, says the ED also had to increase physician and nurse staffing.

To improve patient flow through and also to anticipate an increase in volume as the promise was marketed, Chelucci ensured that the 17-bed ED has three physicians working most of the day, and a fourth is available for busy periods.

Chelucci and his staff also started paying more attention to which rooms patients were placed in for the initial examination.

"For instance, if we have a woman come in with abdominal pain, we try to make sure she's placed in a setting where she could undergo a gynecological exam if necessary, rather than having to wait for such a room to empty because we put someone else there," he points out.

Placing patients in the best possible exam room is the responsibility of the receiving nurse who escorts the patient from the waiting area.

### ***Faster registration a key***

Another big change took place at registration, where staff must generate a medical record case number very quickly and with very little information. The registration staff take only enough information up front to prevent generating a duplicate record number — generally only the patient's name and Social Security number.

"Then they have to go to the patient or family member later and collect the rest of the information and ask about any updates to what was previously in the record," Pugh says.

Bedside registration had been used in the past, but without the quick registration generating a patient number up front because it seemed like a duplication of effort to do the quick registration and the bedside registration.

That led to delays when the doctor showed up in the exam room before the registration clerk and could not

## Sources

For more information on the 30-minute promise and improving patient flow through, contact:

- **Kenneth Chelucci**, MD, FACEP, Medical Director, Emergency Services, St. Anne Mercy Hospital, 3404 W. Sylvania Ave., Toledo, OH 43623. Phone: (419) 407-2663.
- **Dayle Pugh**, RN, BSN, CEN, Clinical Director, Emergency Services, St. Charles Mercy Hospital, 2600 Navarre Ave., Oregon, OH 43616. Phone: (419) 696-7200.

order tests without the patient number.

The goal of the process changes is to keep the patient moving through the system, Pugh says. In fact, “if we ever have to put a patient out in the waiting room because triage is backed up, we know that it’s almost impossible to make that 30-minute deadline,” she says.

And the ED is not just shifting the wait time from the waiting room to the exam room. The hospital’s length of stay in the ED, whether admitted or discharged, used to be 2.8 hours. After implementing the process changes, that time dropped to 1.8 hours.

Other changes were aimed at keeping patients moving out the back end of the ED. Discharge instructions were streamlined, and with substantial help from upper administration, the ED negotiated agreements with other units to take admitted patients from the ED

much more quickly to available beds.

Pugh and Chelucci emphasize that such improvements will be extremely difficult, if not impossible, without top-level support from administration at the outset.

Upper-level administrators can bring disparate departments together and cut through much of the bureaucracy and interdepartmental turf wars, they say.

The sharp decrease in wait times and length of stay were a saving grace once the hospital went public with its 30-minute promise.

Volume increased 30% in a week at St. Charles. From an average of 94 patients a day, the hospital started seeing 130 patients a day in the 26-bed ED.

Last year, the hospital treated 41,000 patients in the ED. The hospital makes good on its 30-minute promise more than 90% of the time, Pugh says. Also, the ED virtually has no patients who leave without being seen, she explains.

Chelucci says few patients leave his ED at St. Anne Mercy without being seen as well.

At St. Charles, patient satisfaction scores had been in the range of the 85th percentile for years but jumped to the 99th percentile in the first quarter after the implementing the process changes and the service promise.

“Patients love anything that keeps them from waiting,” Pugh says. “They don’t really care what you did to make that happen, but it leaves them with a much better feeling about your ED.” ■

## New ‘mini-triage’ system cuts wait time to 15 minutes

The EDs at St. Charles Mercy in Oregon, OH, and St. Anne Mercy in Toledo have adopted a streamlined triage system to shorten waiting times, and managers report that it has been very effective without compromising patient safety.

The EDs previously employed a long, thorough triage process because patients might have had to wait for hours before seeing a physician, explains **Kenneth Chelucci**, MD, FACEP, medical director of emergency services at St. Anne.

The average waiting time was about 40 minutes, which meant some waited much longer. Now that waiting times are down to an average of 15 minutes, the clinicians feel comfortable with a shorter triage process. Triage now takes about three minutes, compared to about 10 minutes before. The triage nurse no longer collects a full medical history, medication list and complex description of the complaint.

“We do a mini-triage where we basically just get

vital statistics and a chief complaint,” he says. “Before we were getting a history of the complaint, doing a cursory nursing examination, and getting vital signs. That doesn’t sound like much, but sometimes, depending on the patient, it could take 15 or 20 minutes.”

The more elaborate triage now is done jointly by the physician and nurse at the bedside. Chelucci points out that expedites physician involvement in the case, and it avoids the patient having to provide the same information twice, which they appreciate.

Though switching to the mini-triage raised some questions about patient safety, he says the ED’s experience has proved otherwise.

“In reality, we think we’ve reduced the risk because we’re getting the physician involved faster,” Chelucci says.

“When someone comes in with hypertensive encephalopathy, they’re not delayed in the waiting area, and the physician lays hands [on them] almost immediately and can expedite treatment. Anything that gets the physician involved faster is going to be better for the patient,” he adds. ■

# This surveillance system goes beyond bioterrorism

*Patterns, outbreaks show up in EDs*

A project that started out as a response to post-9/11 bioterrorism fears is turning out to have much more practical everyday applications, say two ED managers who have pioneered the use of a system that monitors for unusual patterns or patient surges. While still valuable for detecting terrorist attacks, the system can reveal more mundane but useful information in any ED, they say.

Several hospitals in Florida have been trying a unique bioterrorism surveillance system, developed by the University of South Florida's Center for Biological Defense in Tampa, that uses real-time monitoring of ED patients for evidence of exposure to biological agents and health epidemics. The hospitals were chosen because of their proximity to MacDill Air Force Base in Tampa and the large theme parks in central Florida — all prime targets for a bioterrorism attack.

There haven't been any attacks yet, but the ED managers at two of the hospitals tell *ED Management* the system has revealed other patterns and naturally occurring outbreaks that otherwise might have gone unnoticed.

The project began about three years ago, originally as a research project, says **Michael Leon**, RN, research

## Bioterror system reveals other patterns and illnesses in EDs

These are some of the patterns and unusual illnesses detected by the bioterrorism surveillance system being used in some Florida hospitals:

- ✓ A rash illness was identified as Fifth's Disease among international guests at a theme park.
- ✓ Several community cases of meningitis and encephalitis were spotted.
- ✓ The system detected significant regional increases in gastroenteritis illnesses that were later identified as norovirus. The problem was detected more than a month before the Florida Department of Health saw the same pattern.
- ✓ ED managers were alerted to regional spikes of influenzalike illness and respiratory tract infection with fever, which they considered early indicators of the onset of flu season.

Source: Celebration (FL) Health.

## Executive Summary

Florida hospitals are benefiting in practical ways from a system originally designed to detect bioterrorism attacks. The system is proving useful in alerting emergency staff to naturally occurring infections early enough to take proactive action.

- The system is available to any interested ED.
- EDs can use the system to identify common maladies such as influenza in time to prepare for a community outbreak.
- Any ED in a large populated area may find the system useful.

coordinator for the project at Celebration (FL) Health, which provides health care to the town of Celebration, originally designed by the Walt Disney Company. After 1½ years of research, hospital leaders decided to implement the system fully at the hospital and also at two sister facilities, Florida Hospital Kissimmee and Florida Hospital East Orlando.

“We spotted a Legionnaire’s [disease] case recently that we might not have caught,” Leon says. “The system is constantly looking for symptoms that match a list that could mean trouble.”

The program involves screening patients for signs of eight major syndromes indicative of biological exposures from naturally occurring outbreaks and intentional bioterrorism attacks. These syndromes include upper- and lower-respiratory tract infections, influenzalike illnesses, botulismlike syndromes, and many others. The information then is used to provide timely alerts of epidemics that occur naturally or intentionally.

Any ED can implement the surveillance system, Leon says, and the surveillance could prove useful in any well-populated area. **(For contact information for the Center of Biological Defense and to find out more about the system, see source box, p. 55.)** The alert from the system can be received as an e-mail, a page, a phone call, or all three. At Celebration Health, the ED spent between \$8,000 and \$12,000 for the surveillance system and employs two data collection clerks who work two hours a day, seven days a week, at a cost about \$15,000 per year combined.

The Florida EDs have detected numerous illnesses that might have gone undetected without the system, Leon says. **(For more on what the system caught, see box, at left.)** One of the best benefits so far was when the surveillance helped Celebration Health detect the onset of the flu season in October, long before the local health department clued in.

“The state didn’t say anything until February, but by then we’d made sure we had enough antibiotics in

## Sources

For more about the surveillance system, contact:

- **Center for Biological Defense**, Tampa, FL. Phone: (813) 974-6663. Web: [www.bt.usf.edu/](http://www.bt.usf.edu/).
- **Barb Gabel**, BSN, CEN, Director, Emergency Department, Celebration Health, 400 Celebration Place, Celebration, FL 34747. Phone: (407) 764-4000.
- **Michael Leon**, RN, Research Coordinator, Celebration Health, 400 Celebration Place, Celebration, FL 34747. Phone: (407) 764-4000.

stock and the staff were prepared for the increased load," Leon says. "We were able to spot those patients earlier and make sure they weren't spreading the flu through our waiting area."

To avoid spreading the flu, patients with flu symptoms were directed to separate waiting areas and generally kept away from other patients as much as possible, Leon says.

The system also helped identify cases of meningitis and gastroenteritis at Florida Celebration Health, says **Barb Gabel**, BSN, CEN, director of the ED.

"With that notification, we can be more aware of what's going on in the ED and what we might expect to come in the door next," she says. "It helps us be more proactive."

One more piece of paper in the chart doesn't add any significant work burden, and participation in the system is well worth the effort, she says. In particular, the ED staff are assured they have a way to spot naturally occurring infections or bioterrorist attacks at the local theme parks as early as possible. The possibility of a major outbreak among tourists is a constant concern, she explains. "It's always better to know earlier rather than later," Gabel says.

The program is designed to run manually or automated. If the ED has an automated documentation system, the surveillance system will add a pop-up screen that asks if the patient has certain symptoms that correspond with the illnesses under surveillance. That information is sent immediately to an Internet site that compares the data to what is typical for that ED.

At Celebration, there is no automated documentation system, so the surveillance relies on a manual system instead. The triage nurse fills out a special blue form that asks if the patient meets certain criteria for the illnesses under surveillance. If not, the nurse simply checks the "no syndrome" box indicating so. Ninety-seven percent of the ED patients fall into that category.

For the other 3% with symptoms, the form includes further questions such as whether the person has attended one of the local theme parks or been on a cruise ship. That blue sheet stays with the patient's

chart, and at the end of the day, information from all of the forms is entered into the computer and sent to the surveillance system's web site for analysis.

Patient data are de-identified, but there is a tracking number the ED can use to trace back to the patient if needed. The system immediately can return any alerts based on that information, which Leon says is faster than an infection control practitioner or ED manager reviewing all the charts daily or weekly to look for trends.

"On our own, we may not realize trends until way down the line," he says. "Staff work their shift and go home, and then it may take several shifts before anyone starts talking and realizes that we've had an awful lot of patients with a strange rash lately." ■

## Diversion crisis eases, but strategies still critical

Fast-track systems and 23-hour observation units are helping EDs across the country reduce ambulance diversions, but more effort is needed, one analyst says. A hospitalwide focus on more efficient use of beds also is helping ease the problem, she adds.

A wide range of strategies are responsible for a decrease in diversions in the past year, the analyst says. Weekend radiology and lab services also can improve the flow of patients through the ED and reduce the need for diversions, says **Linda R. Brewster**, MBA, a consulting researcher with the Center for Studying Health System Change (HSC), a nonpartisan policy research organization funded principally by The Robert Wood Johnson Foundation in Princeton, NJ.

"It was a great surprise to me to see that more than half of the sites we surveyed are starting to pay specialists to ensure that they are there to cover the ED," Brewster says. "That's a big change, but it can have a significant effect on avoiding diversions."

Some hospitals, especially on the West Coast, are using clinical pathways more in the ED so patients can be followed up in the community after discharge instead of them showing up in the ED again.

"Here's one that really astounded me: A few hospitals that were being overburdened by patients of a particular type actually were paying for them to be cared for in another setting, to keep them from using up beds in the ED," Brewster says. "One hospital found that alcoholics were taking up an inordinate number of beds and time in the ED, so they paid to have them cared for in another facility, just to free up the beds."

## Nursing recruitment, better coordination cut diversions

These were some other key findings from the diversion study released recently by the Center for Studying Health System Change (HSC) in Washington, DC:

- The ongoing nursing shortage has played a significant role in diversions, and hospitals have redoubled efforts to fill nursing vacancies by turning to international recruiting and relatively costly agency or traveling nurses. Hospitals also have improved recruitment and retention of nurses by offering financial incentives and flexible work schedules.
- Growing physician unwillingness to provide emergency on-call coverage has contributed to diversions, and hospitals in six of the 12 communities studied have started to pay certain specialists for on-call coverage and, in some cases, compensate physicians for services provided to uninsured emergency patients to ensure adequate coverage and reduce diversions.
- Many hospitals have appointed bed czars to expedite patient flow through the hospital. Other strategies to speed bed turnover include improving housekeeping procedures to make sure newly vacated rooms are prepared quickly for incoming patients and adding new space for discharged patients to wait for transportation, which allows them to leave their rooms.
- Improved community coordination and oversight have helped stem diversions by improving communication across hospitals. Most of the 12 communities have updated or developed guidelines to define how long diversions can last, the types of patients or conditions deemed off limits from diversions, and the type of capacity limitations that warrant diversions.
- Some hospitals are employing more floor managers in the ED, often retired nurses, to mingle with patients in the waiting area and improve the flow through triage and treatment. The floor managers can help ensure that serious issues are not overlooked in the triage process, answer questions, and assist various staff with their tasks depending on what is needed at the moment. ■

They were willing to do it to have beds free for more profitable patients.”

Because the HSC survey assured participants confidentiality, Brewster cannot reveal the hospitals using those strategies.

The efforts are paying off, according to a study released recently by HSC. **(For information on how to access the study, see resource box, p. 57.)** Brewster was the lead researcher. The study shows that the nationwide surge in ED ambulance diversions has eased as hospitals improved capacity management to free up beds and communities increased coordination to prevent diversions. **(See related story in box, above.)**

Although ED diversions still occur with regularity, HSC's 2002-2003 site visits to 12 nationally representative communities found ambulance diversions are no longer as frequent or as unmanageable. A decrease in inpatient use likely accounts for some of the drop in diversions, but hospitals also have worked to improve staffing, bed availability, and patient flow within and out of hospitals, Brewster says.

He notes ED diversions primarily stem from a lack of critical care beds and other inpatient beds, which creates bottlenecks in the ED and forces hospitals to delay emergency admissions or divert ambulances to other hospitals. While many hospitals are expanding ED capacity to reduce crowding at the point of intake, improved inpatient capacity management has been critical in easing diversions, she says.

ED volume increased dramatically four years ago, leading to a surge in ED diversions, Brewster says. Much of that volume increase was tied to a breakdown of managed care systems that led to patients visiting EDs more easily, without getting prior approval from insurers.

More than 110 million visits were made to the nation's emergency departments in 2002, an increase of more than 3 million over the previous year, according to a new report from the Centers for Disease Control and Prevention (CDC) in Atlanta. **(For information on how to access the report, see resource box, p. 57.)**

**J. Brian Hancock, MD**, president of the Irving, TX-based American College of Emergency Physicians (ACEP), notes that patients were spending more time in EDs and says these trends are likely to continue, especially as the population ages.

“Emergency department overcrowding is a growing and severe problem in the United States, and we all should be concerned,” Hancock says. “As dedicated as emergency physicians and nurses are to caring for our patients, we may not have the resources or the surge capacity to respond effectively.”

Some solutions will require a national commitment and recognition of emergency medicine as an essential community service — more than ED managers can do on their own, he says. But Hancock says any efforts to improve flow through and efficiency in the ED will

## Sources and Resources

For more information on diversions, contact:

- **Linda R. Brewster**, MBA, Consulting Researcher, Center for Studying Health System Change, 600 Maryland Ave. S.W., No. 550, Washington, DC 20024. Phone: (202) 484-5261.
- **J. Brian Hancock**, MD, President, American College of Emergency Physicians, 1125 Executive Circle, Irving, TX 75038-2522. Phone: (800) 798-1822.
- The Center for Studying Health System Change (HSC) study's findings are detailed in *Emergency Department Diversions: Hospital and Community Strategies Alleviate the Crisis*, available free on the HSC web site at [www.hschange.com](http://www.hschange.com). Choose "issue briefs" on the left side of the page, and then select the diversion study.
- The Centers for Disease Control and Prevention report is available free on the web site at [www.cdc.gov](http://www.cdc.gov). Enter "Advance Data Number 340" in the search box.

help ease overcrowding and diversions.

The CDC found two-thirds of emergency patients spent one to six hours in the ED, with the average duration of a visit lasting 3.2 hours. It also found an increase in visits for patients older than 44 years old.

The CDC report also shows emergency patients are increasingly sicker, with a greater percentage of patients being classified as emergent, defined as needing treatment within 15 minutes (22.3%, up from 19.2% in 2001), Hancock notes. The percentage of patients classified as urgent, meaning they need treatment in 15-60 minutes, also increased (34.2%, up from 31.2% in 2001). Nonurgent patients also were up slightly, to 10.2% from 9.1% in 2001.

"Some hospitals have been successful in alleviating the overcrowding problem by moving patients to the floors in which they will be admitted, instead of boarding them in the emergency department," Hancock says. "This shifts the burden throughout a hospital and allows an emergency department to continue to receive ambulance patients, as well as new patients from the waiting room."

The CDC reports that from 1992 to 2002, the number of emergency visits increased on average about 2 million visits: from 89.8 million to 110.2 million annually (up 23%). At the same time, the number of hospital EDs decreased about 15%.

Hancock says emergency patients are increasingly sicker, with a greater percentage of patients being classified as emergent (22.3%, up from 19.2% in 2001), defined as needing treatment in fewer than 15 minutes, and urgent (34.2%, up from 31.2% in 2001), defined as needing treatment in 15-60 minutes. The percentage

of patients classified as nonurgent rose slightly to 10.2% (from 9.1% in 2001), defined as needing treatment in 2-24 hours.

"The numbers are overwhelming sometimes, so hospitals are really employing a wide range of strategies," Brewster says. "Throughput is the critical issue with avoiding diversions, so that's what most of them are focusing on." ■

## Reader Question

### Will new CMS position on billing affect EDs?

**Question:** I've heard the Centers for Medicare & Medicaid Services (CMS) recently issued instructions that require us to provide emergency physicians more detail on what procedures are billed under their names. How is this going to affect billing for my ED?

**Answer:** The change should help emergency physicians avoid billing fraud, but it may have little noticeable effect on EDs, says **George Molzen**, MD, past president of the Irving, TX-based American College of Emergency Physicians (ACEP).

CMS has long had a rule that says physicians should be able to see what is billed in their name, but there was concern that it didn't always happen, Molzen says. ACEP encouraged CMS to make changes that would ensure ED physicians know more about billing. CMS issued reassignment instructions that specifically state the doctor must be provided a detailed accounting of billing under his or her name, whether the hospital or a third-party company handles the billing.

"This has been controversial in emergency medicine when some of the largest companies bill for their doctors, and then it is perceived as a very negative thing when they ask what was done under their names," he says. "We hope this will encourage those groups to open up and inform the doctors what was done in their names. It is important because for Medicaid fraud issues, it is the doctor who is on the hook."

## Source

For more on the reassignment change, contact:

- **George Molzen**, MD, Past President, American College of Emergency Physicians, 1125 Executive Circle, Irving, TX 75038-2522. Phone: (800) 798-1822.

Physician groups and hospitals that handle billing for ED physicians will have to start providing doctors with regular updates on billing. But physicians also may decline detailed reports if they are comfortable with more general reports, Molzen says.

ED managers should see little effect from the CMS instruction, Molzen says. The most direct impact on EDs comes from another provision of the instruction that allows carriers to make Medicare payments to entities, regardless of where they rendered services.

“If an ED employs independent contractors, CMS now allows them to reassign so that the hospital can handle collections on what they do,” Molzen says. “I wouldn’t worry about this change creating any more work at all for EDs.” ■

## EMTALA

### Q & A

## Emergency care: What if it’s on campus, outside ED?

*You don’t necessarily have to send staff*

**Question:** Should we have a plan for responding to patients on the hospital property, but not in the ED area, when they need or request emergency care? The final rule seems to make clear that we are not obligated to rush out of the ED to provide care for anyone who does not come to a “dedicated emergency department,” but we’re not clear on what should happen when that person is elsewhere on the campus.

**Answer:** EMTALA still can be triggered when a person needs emergency care outside the ED, but you don’t necessarily have to send ED staff out to take care of them, explains **Charlotte Yeh, MD, FACEP**, CMS regional administrator in Boston and a former practicing emergency physician.

The final EMTALA rule clarified the controversial “250-yard rule” that many ED managers interpreted to mean they had to provide care to anyone who showed up within 250 yards of the hospital campus even if that was on a public street or otherwise off the campus. It is now clear that EMTALA applies only to dedicated emergency services, other hospital departments, parking lots and driveways, or other hospital property within 250 yards, she says.

That eliminates a lot of situations in which ED

managers previously might have thought EMTALA required a response, but Yeh says there still are some situations in which the law will be triggered outside the boundaries of the ED.

“Under the new EMTALA regulations, if a person shows up in an area that is not a dedicated emergency department as defined in the rules, EMTALA is triggered only if the patient or a prudent layperson observer would believe there is an emergency medical condition,” she says. “If they need emergency care but just happen to come in the wrong door, or if they slip in the cafeteria and hit their head, those are situations in which EMTALA could be triggered on your campus.”

When EMTALA is triggered in such situations, the hospital is obligated to provide a medical screening examination (MSE). But Yeh points out that the MSE can be performed anywhere on the campus. The patient does not have to be transported to the ED, and the exam does not have to be done by ED staff.

“How the hospital responds to those patients is left up to the hospital. From a practical matter, most hospitals tend to have some sort of emergency response protocol to bring the patient to the ED,” she says. “Some hospitals have a code team ready to respond anywhere on campus, and smaller hospitals probably will use emergency staff for that. But each hospital has to decide how to respond based on the physical configuration, staffing, and time of day.”

In such cases, EMTALA may not be the main concern anyway, Yeh says. Even if EMTALA is not triggered in such cases, the hospital still needs an emergency response plan for when someone is injured or falls ill on the campus. Such planning is just good medical practice, she says.

There will be some situations in which it is appropriate to call 911 for people needing emergency care on the hospital campus but away from the ED, Yeh says. She recalls working with one hospital that had an

### Three Criteria for ED

The final version of the Emergency Medical Treatment and Labor Act says an ED is any department or facility of the hospital, whether situated on or off the main hospital campus, that:

- is licensed by the state as an emergency room or emergency department;
- is held out to the public as providing care for emergency medical conditions without requiring an appointment;
- or during its previous calendar year, provided at least one-third of all its outpatient visits for the treatment of emergency medical conditions on an urgent basis. ■

older building on campus, a considerable distance from the ED, with elevators too small for a standard stretcher or gurney. So that hospital's policy required calling 911 for local paramedics, who had folding stretchers that allowed the patient to be brought down in the elevator.

"Hospital personnel still responded and cared for the patient, but the paramedics were called to assist with transportation," Yeh says. "Sometimes on a large campus, calling 911 might be necessary, but that doesn't mean you can ignore the patient in the meantime. If EMTALA is triggered, you still have the obligation to perform that screening examination, even though you've called 911." ■



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## CE/CME questions

7. Which of the following is one benefit of hospitalists cited by Paolo Coppola, MD, ED director at Brookhaven Memorial Hospital Medical Center?
  - A. They are better trained than most physicians.
  - B. They order fewer unnecessary tests.
  - C. They have lower malpractice rates than most physicians.
  - D. They are more available and easier to contact.
8. According to information supplied by Ron Greeno, MD, chief medical officer and senior vice president of physician services at Cogent Healthcare, how will physicians probably respond to the idea of using hospitalists for some patient care?
  - A. All physicians definitely will resist the idea, and vigorously.
  - B. Some may resist the idea at first, but many may welcome hospitalists taking some of the patient load off their hands.
  - C. They almost universally will welcome hospitalists with open arms, with virtually no resistance.
  - D. Most physicians won't care much one way or the other.
9. At St. Charles Mercy Hospital, how did the ED change registration to help make a 30-minute service promise possible?
  - A. Eliminated bedside registration
  - B. Eliminated quick registration at the door
  - C. Added quick registration at the door
  - D. Added bedside registration
10. How did the ED at St. Charles change its triage process to improve patient flow?
  - A. Instituted a longer triage process up front
  - B. Shortened the triage process up front and added a more thorough triage process at the bedside
  - C. Automated all data input during triage
  - D. Required a clerk to work alongside the triage nurse
11. Which of the following is true of the bioterrorism surveillance system, developed by the University of South Florida's Center for Biological Defense?
  - A. It monitors only for infections related to intentional acts of bioterrorism.
  - B. It only monitors for naturally occurring infections.

## COMING IN FUTURE MONTHS

■ Hospital improves patient satisfaction

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■ Patient hoarding: Avoid this staff strategy

■ How many EMTALA signs are enough?

- C. It monitors for naturally occurring infections and intentional acts of bioterrorism.
- D. It does not monitor infections of any type but tracks suspicious injuries that may be related to terrorism.
12. According to Charlotte Yeh, MD, FACEP, Regional Administrator for CMS, which is true for EMTALA?
- A. It is never appropriate to call 911 in response to emergencies occurring on the hospital campus.
- B. It can be appropriate to call 911 in response to emergencies on the hospital campus, but the hospital still is obligated to respond as well.
- C. If a hospital calls 911 for an emergency on the campus, there is never any further EMTALA obligation.
- D. It's appropriate to call 911 for an emergency on campus only after providing an MSE.

## CE/CME instructions

Physicians and nurses participate in this CE/CME program by reading the issue, using the references for research, and studying the questions. Participants should select what they believe to be the correct answers, then refer to the answer key to test their knowledge. To clarify confusion on any questions answered incorrectly, consult the source material. After completing the semester's activity, you must complete the evaluation form provided and return it in the reply envelope to receive a certificate of completion. ■

## CE/CME objectives

- Discuss and apply new information about various approaches to ED management. (See *"Want to improve quality of care and ease the burdens on your physicians?"* and *"Hospitalists use increases: What is the benefit for EDs?"* in this issue.)
- Explain developments in the regulatory arena and how they apply to the ED setting. (See *"EMTALA Q&A."*)
- Share acquired knowledge of these developments and advances with employees. (See *"This surveillance system goes beyond bioterrorism."*)
- Implement managerial procedures suggested by your peers in the publication. (See *"Want to improve service? Promise a 30-minute wait."*) ■

## CE/CME answers

7. D    8. B    9. C    10. B    11. C    12. B

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# ED

# ACCREDITATION UPDATE

*Covering Compliance with Joint Commission Standards*

## Joint Commission surveys: It's a brand new world

*How can you best prepare and educate your emergency department staff?*

As an ED manager, you may be accustomed to handling the brunt of responsibility for accreditation surveys. But under the new Shared Visions — New Pathways process from the Joint Commission on Accreditation of Healthcare Organizations, surveyors will be talking with your staff and your patients. How on earth can you prepare for that?

Learn what to expect from ED managers who have undergone surveys under the new process. **Pattie Walker**, RN, director of the emergency service at Mercy Hospital Grayling (MI) shares this insight:

“There was less focus on policies and procedures and more focus on looking at patient records, talking with staff, and talking with patients and families about their care experience.”

Here are some specific expectations you should have:

- **Patients are likely to be traced to the ED.**

Under the new tracer methodology, surveyors may pull an ED patient's chart and trace that patient's care, including any ancillary services, or they may pull an inpatient's chart and trace that patient's care back to the ED.

At Mercy Hospital Grayling, five ED patients were traced.

“They actually did have a patient chart, but they came and asked about that patient type rather than a specific patient,” Walker says. “They asked, ‘What is your plan of care for a patient with that type of diagnosis?’ They wanted to know how the patient would be referred there, how we would share information, and how would we determine a plan of care.”

Surveyors went to the ED at Trident Medical

Center in Charleston, SC, four times, says **Tom Rounds**, director of emergency services.

Surveyors wanted to know how ED nurses would know a patient had a living will, he says. Surveyors toured the department and asked to see where patients arrive. As they passed equipment, they checked to see when it was inspected. They asked what information is shared from EMS at the bedside and how the family is included in the history and evaluation of patients, Rounds explains.

Surveyors also may ask about ED care outside of your department. At Froedtert Hospital in Milwaukee, surveyors asked a floor nurse about communication from the ED, how report is handled, and where the ED records were in the chart, says **Jody Jesse**, RN, director of the ED.

“They looked thoroughly at completeness of documentation, informed consent, conscious sedation, and consent for treatment,” she says. “Then they came to ED to have a tour and asked the staff RN the same questions about continuum of care.”

- **Patients will be interviewed.**

At Norton Suburban Hospital in Louisville, KY, surveyors quizzed patients who had been admitted through the ED about whether their ED experience was positive, says **Heather Cote**, RN, BSN, MBA, chief nursing officer and vice president for patient care.

“Our clinical care is sound, so [surveyors] wanted to know if the patients felt comfortable, did they feel they were seen in a timely matter, were their needs met, was it a positive interaction with staff and physicians, were they notified and involved in decision making, and did they know

the reason for their admission," Cote says.

Also, patients were quizzed about their transfer from the ED to the floor and whether the person transporting them talked to them, she says. "They want to know patients are involved and informed about their care," Cote says.

- **Surveyors will interact with your staff.**

Typically, staff members are asked about the patient care they provide.

At Trident Medical Center, an ED tech was asked about credentialing and how he was qualified to be part of the team.

At Froedtert Hospital, surveyors quizzed a second-day RN orientee about the nurse's previous experience, the orientation schedule, and why the nurse decided to work at Froedtert Hospital, Jesse says.

Keep in mind that surveyors can ask about general hospital policies, Cote warns.

"They can ask, 'What's the visitor policy for the hospital vs. your department?'" she points out. "Even if we don't know the hospital policy backward and forward, we can say there is a definite visitor policy given upon admission, and it's part of the admission assessment."

- **You will be questioned about the national patient safety goals.**

Surveyors put a significant emphasis on the national patient safety goals, Cote and others emphasize.

"They really focused in on doing the right things for the patient, such as with medications," she says. "They asked, 'How do you ensure you're providing good, safe patient care?' That's a thread we saw through the survey."

When asked about safe patient care, staff responded with specifics, such as the fact that two patient identifiers are used, Cote says. **(For more information on the national patient safety goals, see *ED Management*, March 2003, p. 27.)**

Ensure staff members are familiar with the high-alert medications and list of approved abbreviations, Jesse emphasizes. **(See "Joint Commission warns of abbreviations to avoid," *ED Accreditation Update*, February 2004, p. 3.)**

### **What should you do to prepare?**

Because of the heavy interaction of surveyors with staff, education is a key element of preparing for the new survey process, ED managers point out.

At Norton Suburban, managers educated staff on the national patient safety goals and

## Sources

For more on the new survey process, contact:

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- **Heather Cote**, RN, BSN, MBA, Chief Nursing Officer, Vice President for Patient Care, Norton Suburban Hospital, 4001 Dutchman's Lane, Louisville, KY 40207. E-mail: heather.cote@nortonhealthcare.org.
- **Pattie Walker**, RN, Director, Emergency Service, Mercy Hospital Grayling, 1100 Michigan Ave., Grayling, MI 49738.

the terminology that surveyors use, Cote says.

The education was done informally at staff meetings and on bulletin boards, which listed the goals and terminology, she says.

At Paradise Valley Hospital in National City, CA, the managers ensure staff members understand the department and hospital's mission, says **Stephanie J. Baker**, RN, BSN, CEN, MBA/HCM, director of emergency services.

Also, new and current staff members are given an explanation of the tracer methodology and told what questions to expect, she says.

In addition, the hospital's director of performance improvement puts out a weekly publication called *JCAHO Express News*. This one-page sheet has covered, for example, the patient safety goals and what the hospital is doing to meet each goal. The sheet is posted in the lounge and discussed at change-of-shift meetings, Baker says.

Also, managers have ensured that employees have access to the Joint Commission publications and web site, [www.jcaho.org](http://www.jcaho.org), she explains.

At the ED monthly staff meeting, the manager selects a patient to trace and ask questions.

Baker says, "For example, if the patient was in restraints, I'll say, 'Bill, tell me about your restraint policy. How can I be sure you're competent to put restraints on and monitor patients? How do you assess when a patient's ready to come out of restraints? How do we determine whether it's medical or behavioral restraints?'"

Baker asks about patient rights for those who are put on involuntary hold. Other staff members can interject answers.

And tell your staff to relax, managers emphasize. "I felt the way the surveyors asked the questions was very nonintimidating to staff, so it really put them more at ease," Jesse says. ■

# Wary of unannounced surveys? Try these tips

Many ED managers are unsure of how to prepare for unannounced surveys from the Joint Commission of Accreditation of Healthcare Organizations, which began for all facilities on Jan. 1.

Here are insights from those who have had firsthand experience with the process:

- **You may be surprised by the timing of the survey.**

Even though the Department of Veterans Affairs (VA) Long Beach (CA) Healthcare System had volunteered to pilot test the unannounced survey system this year, the managers were surprised by the timing of the visit.

## **Not up to the usual level of preparedness**

The hospital had been surveyed in August 2001, and the managers thought they would be visited closer to the month they were last surveyed. On a scale of 1-10 of survey preparedness, with 8 being their typical level of preparedness, they were at a 2 or 3, says **Duane Schmuck**, nurse manager at VA Long Beach.

- **Have a backup manager available.**

Providers often are concerned that department leaders may not be available when the surveyors show up for an unannounced survey, says **Linda Murphy-Knoll**, MN, vice president of accreditation service operations at the Joint Commission.

"Since we've pushed the process to the staff level, it's most important that staff be available to surveyors," she says.

The Joint Commission encourages EDs to have a backup person available in case the top leadership isn't available, Murphy-Knoll explains.

- **You may not know what your surveyors are doing.**

At VA Long Beach, surveyors had access to electronic medical records, so they were able to obtain information from the computer without asking for it specifically, says **Jeff Miller**, MD, FACEP, medical director for Team Health, the physician group in the ED.

"It was difficult to ascertain some of what they were doing because of this," he says.

Also, just because the surveyors aren't in the ED doesn't mean that patients aren't being traced, Schmuck says. "I reminded people down here:

Anything they do down here, just because surveyors aren't here, doesn't mean patients aren't being traced."

Schmuck, who was overseeing the intensive care unit while that manager was on vacation, says, "I made a couple of trips to the ED to compliment them on their documentation, which was reviewed from afar in the ICU, patient floor, and even nursing home patients were traced to the ED."

While there was only one actual visit of a surveyor to the ED, "we were reviewed on multiple occasions," Schmuck says.

- **Surveyors will ask staff members questions related to their jobs.**

At Norton Suburban Hospital in Louisville, KY, and other facilities, surveyors ask staff about what they do for the patient.

"When you give caregivers the opportunity to talk about what they do on a daily basis, they're very comfortable talking about them, instead of referring back to policy," says **Heather Cote**, RN, BSN, MBA, chief nursing officer and vice president for patient care at Norton Suburban.

At VA Long Beach, surveyors asked clerks about issues such as the Health Insurance Portability and Accountability Act that are pertinent to their jobs, Schmuck says.

"It didn't seem like they had any hidden agenda," he adds. "There were no trick questions. They were friendly to staff."

Miller had advised the physicians and nurse practitioner to answer any questions simply and honestly without adding superfluous information. "They seemed to do well," he adds.

- **Surveyors will look at all areas, including security.**

During the VA Long Beach survey, a surveyor noticed a police substation located outside of the ED by the triage area. The surveyor interviewed the police for 15 minutes and asked to see the camera system, Schmuck says. The surveyor was

## Sources

For unannounced surveys, contact:

- **Jeff Miller**, MD, FACEP, Medical Director, Team Health, Department of Veterans Affairs (VA) Long Beach Healthcare System, Emergency Department, Long Beach, CA. E-mail: DrJeffMiller46@aol.com.
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concerned that there had not been a police presence when he arrived that morning or the previous day, he says.

"We have a sign-in book, but he felt the area should be manned the whole time, and visitors should have a visitor's pass," Schmuck says.

- **Ensure your files are in order.**

To prepare for unannounced surveys, ensure your yearly competencies are up to date, Schmuck advises. "Make sure the entire staff is not just competent with procedures, but also with changing hospital policies," he says. "If everybody is current on all those things, they can answer any question thrown at them."

Have a designated ED education liaison to make sure this is done, Schmuck suggests.

Make sure everyone is familiar with the usual ED quality assurance policies in areas such as X-rays, labs, and EKGs, etc., Miller says. Make sure your personnel files are in order and up to date and that no one is delinquent on any certification or credentialing issue, he adds.

Although the concept of unannounced surveys sounds disconcerting, Murphy-Knoll has some words of comfort: "We're not giving out scores, and everyone has 90 days to respond to anything we find on site. The final decision doesn't come out until after that." (**For more information on unannounced surveys, see "Continuous compliance: Starting in 2006, your ED must be prepared for unannounced accreditation surveys," May 2003, *ED Accreditation Update*, p. 1.)** ■

## Tours help prepare ED for the real thing

**H**aving managers or directors perform tours of your ED can help you and your staff prepare for unannounced surveys, say sources interviewed by *ED Accreditation Update*.

Department tours also help EDs prepare, managers suggest. At Paradise Valley Hospital in National City, CA, a form is used for weekly mock tours. (**To access form, go to [www.ahcpub.com/mocksurvey.pdf](http://www.ahcpub.com/mocksurvey.pdf).**)

"That's to keep us on our toes, to make sure we get things done on a weekly basis," says **Stephanie J. Baker**, RN, BSN, CEN, MBA/HCM, director of emergency services.

The form lists multiple areas including fire prevention, electrical safety, medical waste, and supplies and equipment. Providers who are conducting tours can check "yes" or "no" regarding compliance. Maintenance is contacted to address areas of non-compliance.

Two charts are reviewed as part of the mock tour, and managers review various areas, including the assessment to ensure it was complete. Staff

members are questioned on various items, such as, "What would you do if there's a fire?"

Once a month, members of the hospital's leadership team tour an area for which they are not normally responsible and complete the mock tour form, Baker says. "It gave us a fresh set of eyes," she adds. The vice president of patient care also participates in those tours, which gives the managers accountability, Baker adds.

Mock surveys help the staff become more comfortable answering questions, according to **Duane Schmuck**, nurse manager at Department of Veterans Affairs (VA) Long Beach (CA) Healthcare System.

At a mock survey held several months before VA Long Beach's recent unannounced survey, managers ensured that all credentialing, licenses, and certifications were up to date, he says.

At Norton Suburban Hospital in Louisville, KY, the patient safety officer and the director of quality tour the ED and talked with staff about why the survey is important, explains **Heather Cote**, RN, BSN, MBA, chief nursing officer and vice president for patient care.

"They said, 'when the surveyors are here, they want to know, and they want our patients to know, we're providing good, safe patient care,'" she points out. ■

## A supplement to answer your accreditation questions

In response to reader interest, *ED Management* is pleased to offer this periodic supplement that will give you greater coverage of topics pertaining to the Joint Commission and its impact on the emergency department. This value-added supplement makes your subscription to *ED Management* even more essential.

Reader feedback is welcome, and questions for the Q & A on the Joint Commission may be directed to Joy Daughtery Dickinson, Senior Managing Editor, at [joy.dickinson@thomson.com](mailto:joy.dickinson@thomson.com).

# Trauma Reports®

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*Pediatric head injuries are common occurrences with the potential for serious morbidity or mortality. Fortunately, the incidence of traumatic brain injury (TBI) has been declining, mainly because of the development of effective prevention strategies (e.g., car seats and bicycle helmets). Although it is difficult to determine the exact incidence of head trauma in children due to variations in definitions and classifications, the majority of head injuries in children are minor and result in no long-term morbidity or mortality. However, early identification of a potentially serious injury and aggressive management of a child with a head injury facilitates the optimal possible outcome. The topic of pediatric TBI is extensive, and the majority of information is very familiar to the practicing emergency department (ED) physician. The author discusses two areas of controversy — patient selection for imaging and an update on management strategies for children with TBI. Selecting patients who require imaging following head trauma is easy if the child has an abnormal mental status or a Glasgow Coma Scale (GCS) score less than 15; he or she needs a head CT scan. The challenge is identifying high-risk patients with a*

*GCS score of 15. The author reviews the available literature and presents currently available guidelines. Since TBI is the leading cause of death and disability, aggressive management of a child with a TBI is critical. The author reviews available therapies and their current application to pediatric patients.*

—The Editor

## Pediatric Controversies: Diagnosis and Management of Traumatic Brain Injuries

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**Reviewer:** **Mary Jo A. Bowman, MD**, Associate Professor of Clinical Pediatrics, Ohio State University College of Medicine; Attending Physician, Columbus Children's Hospital, Columbus, OH.

## Introduction

Trauma is the leading cause of childhood death,<sup>1</sup> and TBI is the leading cause of death and disability for children who sustain trauma.<sup>2</sup> Each year, more than 400,000 children younger than 14 years have emergent evaluations for head trauma.<sup>3,4</sup> Children younger than age 4 have considerable morbidity from head trauma. This age group has a prevalence of TBI that is more than twice the rate of the general population and nearly twice the rate for older children.<sup>4</sup> In addition, recent research indicates that even "minor" trauma may have the potential to result in life-long sequelae.<sup>5,6</sup> Thus, when evaluating children with head trauma, the practitioner must determine which patients are at risk, based on their history and physical exam, for significant injury requiring diagnostic imaging, careful monitoring, and aggressive intervention.

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## Evaluation of Children with Accidental Head Trauma

Injury patterns vary by the age of the child, with older children most likely sustaining an injury while participating in sports or when involved in motor vehicle collisions. However, children younger than 4 years most commonly sustain TBIs as a result of falls, motor vehicle collisions, or abuse. In the younger child, contact head injuries, such as linear skull fractures, hematomas, and cerebral contusions, can occur as the result of short, vertical falls.<sup>7,8</sup>

One study found that children who fell from a greater height were more likely to have injuries, but a number of patients had skull fractures or brain injury following falls from heights of less than three feet.<sup>9</sup> When there is a contact injury to the head, the point of impact causes the inner table of the skull to bend inward, which may injure blood vessels within the epidural or subdural space, as well as the parenchyma of the brain itself.<sup>10</sup> At the same time, there is also simultaneous outbending of the

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skull around the site of impact.<sup>10</sup> This puts the outer table of the skull under tension, and a fracture may result, either proximate to, or remote from, the site of impact. Children who sustain isolated skull fractures typically do not present with significant alterations in mental status, unless there is underlying brain injury with mass effect.<sup>10</sup>

## Children Younger than 2 Years

Children younger than 2 years have been thought to be at high risk for significant brain injury after accidental head trauma.<sup>11</sup> Earlier studies often did not have enough data in the youngest age groups to recommend anything except a very cautious approach to evaluating head trauma in children younger than 2 years.<sup>12,13</sup> It has been estimated that the overall rate of brain injury after trauma in children younger than 2 years is approximately 5%, but infants younger than 2 months may have the highest prevalence of brain injury.<sup>5</sup>

Two studies in 1999 both evaluated infants younger than 1 year who presented to the ED with accidental head trauma.<sup>5,9</sup> The prevalence of brain injury was 12% in the 0-2 month age group, 6% in the 3-11 month age group, and 2% in infants older than 12 months.

Controversy exists in the literature regarding the ability of the physician to use clinical signs and symptoms to identify children at risk for brain injuries following blunt trauma. Obtaining an accurate history and a complete neurologic exam may be challenging, especially in younger children. Children younger than 2 years have been particularly identified as having subtle clinical presentations.<sup>5</sup> In addition, a computerized tomography (CT) scan of the head has disadvantages, including exposure to radiation, transport of the patient out of the ED, and a frequent requirement of sedation.<sup>14-16</sup>

**Scalp Hematomas.** Greenes and Schultzman sought objective markers of the presence of TBI and identified significant scalp hematomas as strongly associated with a skull fracture and brain injury in children younger than 2 years.<sup>5</sup> Another study also found the presence of a scalp hematoma to be the most important predictor variable for TBI identified on CT scan (e.g., intracranial hemorrhage, hematoma, or cerebral edema), in children 2 years and younger.<sup>17</sup> Finally, Greenes and Schultzman (2001) evaluated children younger than 2 years who sustained accidental head trauma, but had no neurological signs or symptoms.<sup>18</sup> The size and location of the scalp hematoma (e.g., parietal and temporal), and age younger than 3 months were each associated with skull fractures. This study also found that a skull fracture, large hematoma, and parietal location were associated with brain injury.<sup>18</sup> Children without a history of neurological symptoms and with a normal scalp exam were identified as a low-risk group.<sup>9</sup>

**Abnormal Mental Status.** Other series have examined the ability of an abnormal mental status to predict an abnormality on CT. Palchak et al found that of 194 children age 2 years and younger, all 15 children with a TBI on CT were predicted by the presence of a scalp hematoma and an abnormal mental status (sensitivity 100%; 95% CI 81.9—100%).<sup>17</sup> Of the 60 chil-

dren in this series age 2 years and younger who underwent CT and had a normal mental status examination and no scalp hematoma, none had a TBI identified on CT scan (negative predictive value 100%; 95% CI 95.1—100%). Lethargy, irritability, full or bulging fontanel, and vital signs suggestive of increased intracranial pressure (ICP) also have been associated with brain injury, while vomiting and loss of consciousness, at least in this age group, were not.<sup>5</sup>

**Skull Fractures.** Palchak et al found that of the 194 children age 2 years and younger who underwent CT scan, 15 (7.7%) had skull fractures on CT, and 46.7% had an associated TBI identified on CT.<sup>17</sup> Another study reported on 102 infants younger than 13 months with skull fractures. Fifteen of the 102 patients were found to have a brain injury. The authors found that patients with lethargy prior to presentation or in the ED and patients with parietal fractures were more likely to have sustained a brain injury.<sup>19</sup>

**Guidelines.** A multidisciplinary panel of nine experts in pediatric head trauma was convened.<sup>20</sup> All evidence gathered from a Medline search was reviewed, and using a modified Delphi technique, a set of guidelines for the evaluation of children younger than 2 years with minor head trauma was developed. Among the guiding principles the panel recommended were the following: One should have a lower threshold for diagnostic imaging in young children, with children younger than 12 months being at higher risk and children younger than 3 months being at the highest risk for intracranial injury after head trauma; the greater the number and severity of signs and symptoms, the stronger the consideration should be for obtaining a CT. The greater the forces involved, the more pronounced the physical findings (e.g., scalp swelling), and the younger the age, the greater the risk for intracranial injury.

Specifically, the panel stratified the patients into risk categories based upon clinical features (e.g., history and physical examination), mechanism of injury, and absence/presence of a skull fracture.

*High-risk patients* had any of the following characteristics: depressed mental status, focal neurologic findings, signs of depressed or basilar skull fracture, seizure, irritability, acute skull fracture, bulging fontanel, vomiting greater than five episodes or for more than six hours, and loss of consciousness greater than one minute. All high-risk patients required a cranial CT scan.

*Intermediate-risk patients* had any of the following characteristics: vomiting three to four times; loss of consciousness less than one minute; history of lethargy or irritability, now resolved; caretakers concerned about current behavior; higher force mechanism; hematoma (especially large or nonfrontal in location); unwitnessed trauma; fall onto a hard surface; vague or no history of trauma with evidence of trauma; and nonacute skull fracture older than 24–48 hours. Patients in this category could be managed in one of two ways: a period of observation (4–6 hours recommended) and reevaluation, or a head CT scan.

*Low-risk patients* were defined as having low-energy mechanism (e.g., fall less than 3 feet), no signs or symptoms, and

more than two hours since the injury; also, the panel found that as the patient's age increases, the risk decreases. These patients may be observed in the ED or at home with reliable caretakers.<sup>20</sup>

Apart from these findings and the panel recommendations, evidence exists suggesting that the youngest age group is more likely to have brain injury with no neurological findings.<sup>6,21,22</sup>

## Children Older than 2 Years

For older children, it is easier to obtain historical information and an accurate physical examination. Many series have sought to determine historical factors and clinical features that are predictive of an intracranial injury. A recent prospective study found that in 2043 children younger than 18 years with head trauma, an abnormal mental status, clinical signs of skull fracture or scalp hematoma (in patients younger than 2 years), history of headache and vomiting were predictive of intracranial injury.<sup>17</sup> The most important variable in this series was clinical findings of a skull fracture.

These five clinical findings identified 97 (99%; 95% CI 94.4—100%) of the 98 children with TBI on CT scan and all 105 children with TBIs that required acute intervention. Of the 304 (24%) children with CT scans who didn't have any of the five predictors, only one had a TBI on CT scan (0.3%; 95% CI 0—1.8%). Of the 825 patients who had none of the five predictors, no one had a TBI requiring acute intervention (negative predictive value 100%; 95% CI 99.6—100%). Use of this rule would have decreased CT scan utilization by approximately 25%.<sup>17</sup> Similarly, another study found that children older than 2 years with closed head trauma who were neurologically normal and had no clinical signs of skull fracture could be managed safely without cranial CT.<sup>23</sup>

In 1999, the American Academy of Pediatrics published guidelines for the management of closed head trauma in previously healthy children 2–20 years of age.<sup>24</sup> This consensus statement used the historical features of loss of consciousness and the presence of symptoms as an indication for obtaining a CT scan of the head. For those children without a loss of consciousness, a thorough history and physical examination should be performed, and a competent caregiver should observe the patient for any deterioration in mental status. For those who have a history of a brief loss of consciousness, along with amnesia, headache or vomiting at the time of evaluation, the prevalence of intracranial injury may be as high as 7%.<sup>25–27</sup> Though many of these brain injuries may have little clinical consequence, a minority of these children may require neurosurgical intervention.<sup>26–28</sup> Therefore, in this group of symptomatic children with a brief loss of consciousness, CT scanning of the head may be useful. However, with a brief loss of consciousness alone in an otherwise asymptomatic patient, observation of the patient for neurological deterioration may be an acceptable alternative to obtaining a CT scan of the head.<sup>24</sup>

While CT scanning is usually a safe procedure, some children may require sedation to obtain the study. Therefore, one must consider the risks of sedation against the benefits of obtaining a CT scan in this group of asymptomatic patients.

Once a TBI has been detected, the type of facility where the child will be evaluated and treated is important to the recovery. Several studies have examined the impact of pediatric trauma centers on the initial management of pediatric trauma. One study evaluated the morbidity and mortality rates among pediatric trauma victims in Pennsylvania and found that morbidity and mortality from TBI was reduced significantly in patients who were treated at pediatric trauma centers.<sup>29</sup> More neurosurgical procedures were performed in pediatric trauma centers, and there was concomitant lower mortality from TBI.<sup>29</sup> Another study found that the mortality rate was significantly higher for children with TBIs who were first transported to non-pediatric hospitals and subsequently transferred to pediatric trauma centers.<sup>30</sup> Thus, it is important that children with brain injuries be transferred to the nearest pediatric trauma facility as soon as it is feasible.

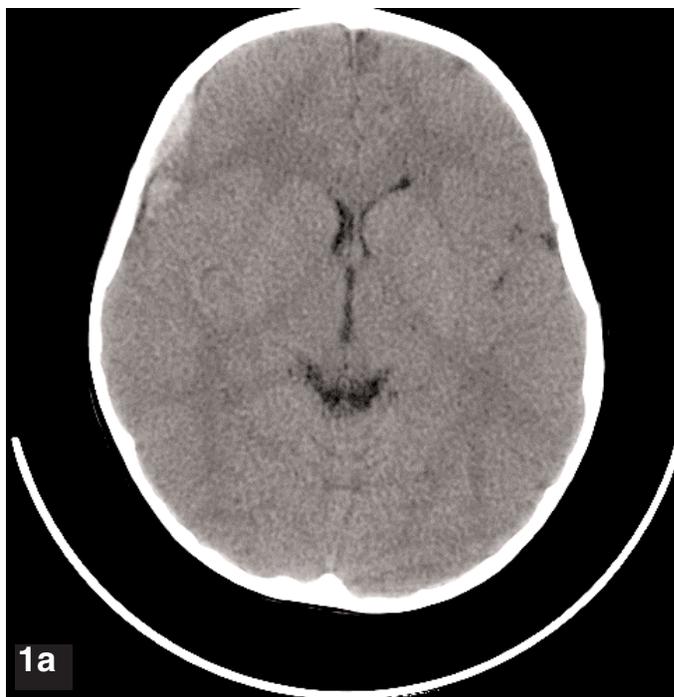
The guidelines for the acute management of severe TBI in infants, children, and adolescents made transfer to a pediatric trauma center a guideline based upon class II data (prospective and retrospective observation, cohort, and case control) and strong class III data (retrospective), and, as an option, an adult trauma center with qualifications for pediatric treatment.

### Management of Intracranial Injuries

**Group 1: Asymptomatic Intracranial Injuries.** The optimal management and outcome of children who have intracranial injury as detected by CT scan, but who are otherwise asymptomatic, is controversial. Typically, such children are admitted to the hospital for close neurological assessment and monitoring. Many pediatric neurosurgeons have adopted an approach of expectant management for small intracranial and extradural hematomas, taking into consideration the size of the hematoma, its propensity to increase in size, shift of midline intracranial structures and surrounding cerebral edema.<sup>24</sup> (See Figure 1.) In some cases, children with subdural hemorrhage from minor trauma may do quite well with expectant management. Four patients were reported with unilateral subdural hemorrhage, of which three occurred from minor trauma and one from a fall out of a window. In all four cases, the subdural hemorrhage resolved spontaneously within 48 hours of injury.<sup>31</sup>

Critical to the management of children with an acute TBI is the initial assessment of the child's neurologic status and ongoing monitoring. Standardized assessment scores are the most accurate for detecting subtle changes in a patient. The GCS is useful for repeated neurological assessments in children with TBI. (See Table 1.) In one study, the most important prognostic indicators for pediatric TBI were demonstrated: the presence of associated trauma, admission GCS scores, traumatic mass lesions with ICP, and the presence of diffuse axonal injury.<sup>32</sup> There are modifications to the GCS to accommodate children who are preverbal or who are unable to verbally communicate due to sedation or endotracheal intubation. Such modifications include the Children's Coma Scale and the Infant Face Scale.<sup>33,34</sup> (See Table 2.)

### Figure 1a and 1b. Rapidly Expanding Epidural Hematoma



**1a.** A head CT of a child performed two hours after a fall. The child had progressive emesis and lethargy. **1b.** Same patient's head CT five hours after the head trauma done secondary to increasing lethargy. Note the rapidly expanding epidural hematoma.



**Group 2: Symptomatic Intracranial Injuries.** The primary injury is the injury that occurs to the brain as a direct result of the trauma. Once an intracranial injury has occurred, management is directed at preventing secondary insults, which can exacerbate the primary brain injury and make the patient susceptible to progressive brain injury. The major, avoidable secondary insults include hypoxia and hypotension, which may

**Table 1. Glasgow Coma Scale**

EYE OPENING	
Spontaneous	4
Verbal stimulation	3
Painful stimulation	2
None	1
MOTOR	
Obeys commands	6
Localizes	5
Withdraws	4
Flexion	3
Extension	2
None	1
VERBAL	
Oriented	5
Confused	4
Inappropriate	3
Incoherent	2
None	1

occur in the patient with multiple trauma; and intracranial hypertension, which may occur after the primary brain injury. Secondary brain injury causes a loss of cerebrovascular autoregulation and may result in cerebral edema, thereby reducing cerebral blood flow. Secondary brain injury also may be due to release of excitatory neurotransmitters, which can alter intracellular ion concentrations; and to the formation of inflammatory mediators, which can disrupt the blood-brain barrier and exacerbate neuronal damage.<sup>35-37</sup> Therefore, the goals of treatment of children with significant brain injury are to lower ICP and maximize cerebral perfusion pressure and oxygen delivery to the brain.

Monitoring of the ICP is appropriate in patients who have GCS score of 8 or less; have an abnormal initial CT scan of the head that demonstrates hematomas, contusions, or cerebral edema; or in whom serial neurological examinations are not possible due to other injuries, sedation, or neuromuscular blockade. There have been several studies in children that demonstrate an association between intracranial hypertension and poor neurological status at hospital discharge.<sup>38,39</sup>

**ICP Monitoring.** Recently published guidelines for the management of severe TBI in children recommend that a ventricular catheter connected to an external strain gauge is the most accurate and reliable manner in which to monitor ICP.<sup>41</sup> Such a device also allows for therapeutic diversion and analysis of cerebrospinal fluid.<sup>40</sup> These guidelines also recommend that the ventricular ICP be used as the reference standard in comparing the accuracy of ICP monitors placed in other cranial compartments.<sup>41</sup> Intracranial hypertension is defined as an ICP greater than 20 mmHg. The guidelines recommend that therapy be instituted when the ICP is consistently between 20-25 mmHg.<sup>41</sup> Other authors have suggested that the treatment of

**Table 2. Glasgow Coma Scale — Modifications for Children**

CHILDREN'S COMA SCALE (HAHN ET AL 1988) BEST SCORE = 15	
• Modification to best verbal response	
Smiles, orients to sound, follows objects, interacts	5
Consolable	4
Inconsistently consolable	3
Inconsolable	2
No response	1
INFANT FACE SCALE (DURHAM ET AL 2000) BEST SCORE = 15	
• Modification to best motor response	
Spontaneous normal movements	6
Hypoactive movements	5
Nonspecific movement to deep pain	5
Abnormal, rhythmic, spontaneous movements	3
Extension, either spontaneous or to pain	2
Flaccid	1
• Modification to best verbal response	
Cries spontaneously to handling or pain, alternating with quiet wakefulness	5
Cries spontaneously to handling or minor pain, alternating with sleep	4
Cries to deep pain only	3
Grimaces only to pain	2
No facial expression to pain	1

elevated ICP should be age dependent. In the young infant, treatment should begin when the ICP is greater than 15 mmHg; for children younger than 8 years, when the ICP is greater than 18 mmHg; and for older children and adolescents, when the ICP is greater than 20 mmHg.<sup>35</sup>

**ICP Reduction.** There are several methods to reduce ICP. Hyperventilation to reduce the pCO<sub>2</sub> below 35 mmHg may be useful in the setting of an acute rise in ICP or when signs of impending herniation are present. While hyperventilation may temporarily reduce intracranial hypertension, it also increases the volume of hypoperfused tissue in the injured brain; thus long periods of hypocarbia should be avoided.<sup>41</sup> The child's head should be maintained in a neutral position, and the head of the bed elevated to 30°. These maneuvers may decrease ICP without significantly changing cerebral perfusion pressure.<sup>35</sup> Jugular venous obstruction, which can elevate ICP, should be avoided by ensuring that cervical collars and endotracheal tube ties are not constrictive around the neck.<sup>35</sup>

Cerebral perfusion pressure (CPP) is defined as the difference between the mean arterial pressure and the ICP. The CPP is the gradient that promotes cerebral blood flow and substrate delivery to the brain. A CPP of 40-65 mmHg represents a spectrum to guide the efficacy of therapeutic interventions. Children with a CPP of 40-50 mmHg tend to have better survival after TBI.<sup>42-45</sup> Some authors have recommended that in young children, the CPP be maintained above 40-45 mmHg and above 50 mmHg in older children and adolescents.<sup>35</sup>

## Therapeutic Interventions

**Airway Management.** *Hypoxia.* Patients should be well oxygenated throughout their ED course. Sedation and neuromuscular blockade may be useful to reduce the untoward effects of painful and noxious stimuli in patients with TBIs. Such stimuli include endotracheal intubation and mechanical ventilation, endotracheal suctioning, placement and maintenance of intravascular or intracranial catheters and monitoring devices, and transport for diagnostic procedures. Painful or stressful stimuli may increase the brain's oxygen consumption and increase sympathetic tone, leading to systemic hypertension and bleeding from operative sites.<sup>46-48</sup> There has been no systematic study of the efficacy of sedative and paralytic agents in children with TBI, and thus, there is no consensus as to what constitutes the ideal agents for sedation and neuromuscular blockade in this group of patients. There are case reports of the systematic, but limited, use of benzodiazepines, barbiturates, propofol, and non-depolarizing paralytic agents in children with TBI.<sup>48</sup> Prolonged use of propofol should be avoided in children because of reports of metabolic acidosis associated with its use. When using such agents, one must be aware of potential age-related differences in the response to pain and stress and in the level of sedation that patients may have.

**Hypotension.** Hypotension, which may occur in a pediatric multi-trauma patient, should be managed aggressively. Patients should be monitored carefully for the early signs of shock, including tachycardia, prolonged capillary refill, and loss of peripheral pulses. All volume deficits should be corrected and transfusions, when indicated, should not be delayed, to maintain hemoglobin and hematocrit at 10 mg/dL and 30%, respectively.<sup>49</sup>

**Osmolar Agents.** Osmolar agents, such as hypertonic saline and mannitol, have long been used in the treatment of children with TBI. Hypertonic saline works by increasing serum sodium concentration and serum osmolarity, creating an osmotic gradient by which water is pulled from the intracellular and interstitial compartments into the intravascular compartment. This increases intravascular volume and cerebral perfusion pressure, and reduces cerebral edema and ICP. One study reported results of a double-blind, crossover study comparing 3% saline and 0.9% saline boluses in 18 children with TBI.<sup>50</sup> During the initial trial boluses with hypertonic saline, the ICP decreased and there were reduced requirements for additional interventions. The guidelines for the acute management of severe traumatic brain injury in infants, children, and adolescents lists hypertonic saline as an option. The guidelines point out that hypertonic saline has evidentiary support, but mannitol has clinical acceptance and safety. Though mannitol works in a similar fashion, the blood brain barrier is able to exclude sodium chloride from the intracranial compartment, making it less likely to accumulate in the interstitial space.<sup>51</sup> Hypertonic saline also causes a reduction in vascular resistance by decreasing edema in the vascular endothelium of injured tissues.<sup>52</sup> Hypertonic saline also may normalize resting membrane potentials and cell volumes by restoring normal intracellular electrolyte balance in injured brain cells.<sup>53</sup> Rapid lowering of the serum sodium con-

centration should be avoided. Rebound cerebral edema can occur due to intracellular fluid shifts when the serum sodium concentration falls rapidly in the face of a residual hyperosmolar intracellular environment.<sup>52</sup>

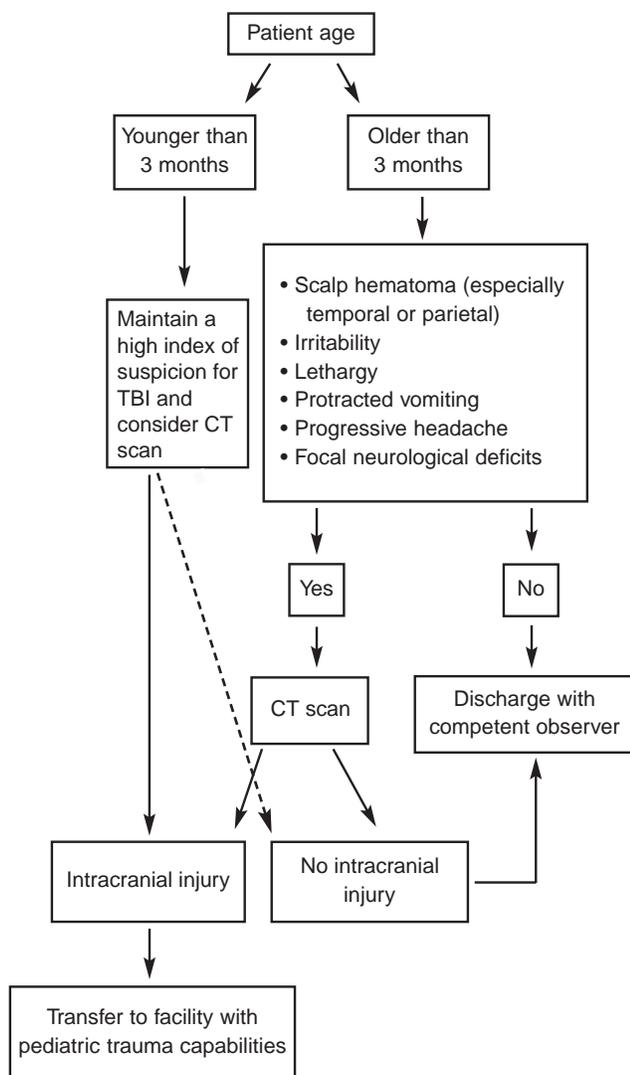
Mannitol works in a similar fashion by decreasing blood viscosity and, thereby the diameter of cerebral blood vessels. Cerebral blood flow is maintained by reflex vasoconstriction of the cerebral vasculature, but cerebral blood volume and ICP are reduced.<sup>54</sup> This mechanism relies on intact autoregulation of cerebral blood flow by the brain. Mannitol also reduces ICP by changing the osmotic gradient within the cerebral vasculature, causing water to move from injured tissues into cerebral blood vessels.<sup>54</sup> Mannitol should be administered as intermittent bolus doses. Prolonged administration of mannitol can result in its accumulation within injured tissues, reversing the osmotic gradient with the cerebral vasculature and worsening cerebral edema.<sup>55</sup>

**Cerebral Metabolism Reduction.** Reducing cerebral metabolism may be helpful in reducing ICP. Early initiation of barbiturate coma may reduce the risk of secondary brain injury. Barbiturates can lower ICP by reducing cerebral metabolism, altering cerebrovascular tone and reducing neuronal, free-radical injury.<sup>35</sup> Lower doses of pentobarbital initially may be given to prevent myocardial depression and systemic hypotension. It may not be necessary to use higher doses of pentobarbital to obtain burst suppression on the electroencephalogram (EEG), as lower doses still may have significant neuroprotective effects.<sup>35</sup>

**Seizure Control.** Seizures can cause a rise in ICP by increasing the brain's metabolic demands, releasing excitatory neurotransmitters, and raising systemic blood pressure. Antiepileptic drugs (e.g., phenytoin, fosphenytoin, or phenobarbital) may be helpful to prevent seizures within the first week after severe TBI, but their effectiveness in preventing late onset (i.e., longer than one week) seizures has not been demonstrated.<sup>56</sup> Some authors have recommended antiepileptic prophylaxis if there is significant parenchymal injury in children with severe TBI.<sup>35</sup> Children younger than 2 years of age are at high risk of post-traumatic seizures, with 44-70% of those with severe brain injuries having post-traumatic seizures.<sup>35,57</sup>

**Hypothermia.** The role of hypothermia in the treatment of children with TBI is unclear. While initial studies in adults demonstrated benefit in adults with TBI and intracranial hypertension, a recent randomized prospective study showed that hypothermia did not reduce morbidity and mortality in adults with severe TBI.<sup>58-60</sup> A similar degree of hypothermia has been shown to be efficacious in children with uncontrolled intracranial hypertension after TBI.<sup>61</sup> While intracranial hypertension was ameliorated after 48 hours of induced hypothermia when compared with the normothermic group, functional outcomes of survivors were similar between the two groups. A larger randomized trial is needed to definitively determine if induced hypothermia improves survival in children with TBI. Currently, the Guidelines for Acute Management of Severe Traumatic Brain Injury in Infants, Children and Adolescents recommend as an option, to avoid hyperthermia (i.e., temperature is higher than 38.5°C), and consider hypothermia (i.e., temperature is

**Figure 2. Children Younger than 2 Years with a Head Injury**



32-33°C) if refractory intracranial hypertension occurs.

**Operative Intervention.** Finally, operative intervention may be a necessary adjunct to medical therapy for severe TBI. Significantly depressed skull fractures should be elevated and intracranial and intraparenchymal mass lesions should be evacuated or debrided when ICP and CPP cannot be optimally managed by medical measures.<sup>35</sup> Some studies have demonstrated that decompressive craniectomy may be useful for pediatric patients with severe head injuries with uncontrolled intracranial hypertension.<sup>62,63</sup>

### Predictors of Outcome

There has been a significant decline in the morbidity and mortality of pediatric TBI in the United States during the past two decades.<sup>64</sup> The overall mortality of children with TBI in the United States has been reported to be 6%, and those children with severe head injury requiring mechanical ventilation have a mortality of approximately 18%.<sup>65,66</sup>

There may be several reasons for such a decline in morbidity

and mortality. One study analyzed consecutive admissions of children with TBIs to three different pediatric intensive care units. He found that while there was significant variation among centers with respect to the use of neuromuscular blockade, induced hypothermia and ICP monitoring, none of these modalities had an effect on mortality. Only the use of antiepileptic agents significantly reduced mortality in this study.<sup>67</sup> Another study found that in children with severe traumatic brain injuries, survival was associated significantly with the maintenance of supranormal systolic blood pressure (i.e., greater than 135 mmHg).<sup>68</sup> Mannitol was associated with a prolonged length of stay in the pediatric intensive care unit, but had no effect on survival. Similarly, Pigula found that children with severe head injuries and systemic hypotension had a much greater mortality rate.<sup>69</sup> Further study is needed to determine which interventions have an impact on morbidity and mortality in children with TBIs.

Several investigators have evaluated which factors may predict both survival and functional outcomes of children with TBI. In severe TBI, the GCS score and Pediatric Risk of Mortality Score (PRISM) may be predictive of survival.<sup>66</sup> In a retrospective study, children with GCS scores less than or equal to 5, but with lower PRISM scores, were more likely to survive and be discharged from the hospital. At hospital discharge, 40% of these patients were functioning independently; and at two years after the injury, nearly 66% were functioning independently. However, independent functioning in childhood may not persist into adulthood. In another study, 39 adults who had sustained TBI during the preschool years were evaluated.<sup>70</sup> While 59% of these patients attended a regular school after recovering from their TBI, only 29% eventually had full time employment as adults.<sup>70</sup> Most of these patients had sustained their TBI nearly 30 years ago, and it can be argued that recent advances in resuscitation of brain-injured children eventually may improve functional outcomes that persist into adulthood. Finally, serum levels of protein S-100 beta, a calcium-binding, dimeric protein found in astroglial and Schwann cells, when obtained and measured at the initial time of injury, may have predictive value in determining functional outcome in children and adults with mild to severe TBI.<sup>71,72</sup>

School-age children who survive TBI are at risk for having neuropsychological deficits and developing psychiatric syndromes. Children who survive severe TBI are at risk of having deficits in verbal reasoning, learning and recall, attention, executive functions, and constructional skills within 12 months of hospital discharge. Even when evaluated as long as four years after the injury, there may be little long-term recovery of such skills.<sup>73</sup> Children who recover from both mild and severe TBI are more likely than those who recover from orthopedic injuries to have psychiatric disturbances, such as organic personality disorder, attention deficit-hyperactivity disorder, major depression, and anxiety disorders.<sup>74</sup> Siblings and parents of children who survive severe TBI may also experience psychological distress during the patient's recovery and rehabilitation periods.<sup>75,76</sup>

## Summary

TBI can cause considerable morbidity in young children. Children younger than 1 year, and particularly those younger than 3 months, are at higher risk of sustaining a TBI after head trauma than are older children. Scalp hematomas, especially those over the parietal region, altered mental status, and focal neurological signs, are the best clinical indicators of TBI in children.

Children with TBI are best managed at trauma centers, and transfer to such facilities should be expedited when TBIs are diagnosed in children. Once a primary brain injury, or trauma that results directly from impact, has occurred, the goals of management are directed at preventing secondary insults, which can exacerbate the primary brain injury and make the patient susceptible to secondary brain injury. Maximizing CPP and reducing ICP are the goals of management of children with TBIs. Sedation, neuromuscular blockade, hyperosmolar therapy, barbiturate therapy, and antiepileptic prophylaxis are management options in children with TBIs.

Finally, children and their families will require considerable support during the rehabilitation phase after a TBI. Psychological and psychiatric sequelae are common in children after a TBI, and significant family stress can occur during the patient's recovery and rehabilitation period.

## References

1. National Vital Statistic System. Ten leading causes of death, United States 1999. Atlanta, GA:National Center for Injury Prevention and Control, Centers for Disease Control; 1999.
2. Hoyert DL, Arias E, Smith B, et al. Final Data for 1999: National Vital Statistics reports. Vol 49. Hyattsville, MD: National Center for Health Statistics; 2001.
3. Guerrero JL, Thurman DJ, Sniezek JE. Emergency department visits associated with traumatic brain injury: United States, 1995-1996. *Brain Injury*. 2000;14:181-186.
4. Jager TE, Weiss HB, Coben JH, et al. Traumatic brain injuries evaluated in U.S. emergency departments, 1992-1994. *Acad Emerg Med* 2000; 7:134-140.
5. Greenes DS, Schutzman SA. Clinical indicators of intracranial injury in head injured infants. *Pediatrics* 1999;104:861-867.
6. Quayle KS, Jaffe DM, Kupperman N, et al. Diagnostic testing for acute head injury in children: When are head computed tomography and skull radiographs indicated? *Pediatrics* 1997;99:1-8.
7. Helfer RE, Storis T, Black M. Injuries resulting when small children fall out of bed. *Pediatrics* 1977;60:533.
8. Joffe M, Ludwig S. Stairway injuries in children. *Pediatrics* 1988; 82:451-461.
9. Gruskin KD, Schutzman SA. Head trauma in children younger than 2 years. Are there predictors for complications. *Arch Ped Adolesc Med* 1999;153:15-20.
10. Hymel KP, Bandak FA, Partington MD, et al. Abusive head trauma? A biomechanics based approach. *Child Maltreat* 1998;3: 116-128.
11. Masters SJ, McClean PM, Arcarese JS, et al. Skull x-ray examinations after head trauma: Recommendations by a multidisciplinary panel and validation study. *N Engl J Med* 1987;316:84-91.
12. Dietrich AM, Bowman MJ, Ginn-Pease ME, et al. Pediatric head injuries: Can clinical factors reliably predict an abnormality on computed tomography? *Ann Emerg Med* 1993;22:1535-1540.
13. Schynoll W, Overton D, Krome R. A prospective study to identify high-yield criteria associated with acute intracranial findings in head injured patients. *Am J Emerg Med* 1993;11:321-326.
14. Brenner DJ, Elliston C, Hall E, et al. Estimated risks of radiation-induced fatal cancer from pediatric CT. *AJR Am J Roentgenol* 2001;176:289-296.
15. Brody AS, Guilleman RP. Radiation risk from diagnostic imaging. *Pediatr Ann* 2002;31:643-647.
16. Cooners GP, Sack WWK, Leahy NF. Variations in sedating uncooperative, stable children for post-traumatic head CT. *Pediatr Emerg Care* 1999;15:241-244.
17. Palchak MJ, Holmes JF, Vance CW, et al. A decision rule for identifying children at low risk for brain injuries after blunt head trauma. *Ann Emerg Med* 2003;42:492-506.
18. Greenes DS, Schutzman SA. Clinical Significance of scalp abnormalities in asymptomatic head injured infants. *Ped Emerg Care* 2001;17:88-92.
19. Shane SA, Fuchs SM. Skull fractures in infants and predictors of associated intracranial injury. *Ped Emerg Care* 1997;13:198-203.
20. Schutzman SA, Barnes P, Duhaime AC, et al. Evaluation and management of children younger than two years old with apparently minor head trauma: Proposed guidelines. *Pediatrics* 2001;107: 983-993.
21. Duhaime AC, Alario AJ, Lewander WJ, et al. Head injury in very young children: Mechanisms, injury types, and ophthalmologic findings in 100 hospitalized patients younger than 2 years of age. *Pediatrics* 1992;90:179-185.
22. Ng SM, Toh EM, Sherrington CA. Clinical predictors of abnormal head computed tomography scans in paediatric head injury. *J Paed Child Health* 2002;38:388-392.
23. Davis RL, Mullen N, Makela M, et al. Cranial computed tomography scans in children after minimal head injury with loss of consciousness. *Ann Emerg Med* 1994;24:713-714.
24. American Academy of Pediatrics. The management of minor closed head trauma in children. *Pediatrics* 1999;104:1407-1415.
25. Dietrich AM, Bowman MJ, Ginn-Pease ME, et al. Pediatric head injuries: Can clinical factors reliably predict an abnormality on computed tomography? *Ann Emerg Med* 1993;22:1535-1540.
26. Dacey RG, Alves WM, Rimel RW, et al. Neurosurgical complications after apparently minor head injury: Assessment of risk in a series of 610 patients. *J Neurosurg* 1986;65:203-210.
27. Hahn YS, McLone DG. Risk factors in the outcome of children with minor head injury. *Pediatr Neurosurg* 1993;19:135-142.
28. Rosenthal BW, Bergman I. Intracranial injury after moderate head trauma in children. *J Pediatr* 1989;115:346-350.
29. Potoka DA, Schall LC, Gardner MJ, et al. Impact of pediatric trauma centers on mortality in a statewide system. *J Trauma Inj Infect Crit Care* 2000;49:237-245.
30. Johnson DL, Krisnamurthy S. Send severely head injured children to a pediatric trauma center. *Pediatr Neurosurg* 1996;25:309-314.

31. Duhaime AC, Christian C, Armonda R, et al. Disappearing subdural hematomas in children. *Pediatr Neurosurg* 1996;25:116-122.
32. Levi L, Guilburd JN, Linn S, et al. The association between skull fracture, intracranial pathology, and outcome in pediatric head injury. *Br J Neurosurg* 1991;5:617-625.
33. Durham SR, Clancy RR, Leuthardt E, et al. CHOP infant coma scale (Infant Face Scale): A novel coma scale for children less than two years of age. *J Neurotrauma* 2000;17:729-737.
34. Hahn YS, Chyung C, Barthel MJ, et al. Head injuries in children under 36 months of age. *Child's Nerv Syst* 1988;4:34-49.
35. Mazzola CA, Adelson PD. Critical care management of head trauma in children. *Crit Care Med* 2002;30:S393-S401.
36. Hanley DF. Multiple mechanisms of excitotoxicity. *Crit Care Med* 1999;27:451-452.
37. Kossman T, Stahel PE, Lenzlinger PM, et al. Interlukin-8 released into the cerebrospinal fluid after brain injury is associated with blood-brain barrier dysfunction and nerve growth factor production. *J Cerebral Blood Flow Metab* 1997;17:280-289.
38. Michaud LJ, Rivara FP, Grady MS, et al. Predictors of survival and severity of disability after severe brain injury in children. *Neurosurg* 1992;31:254-264.
39. Alberico AM, Ward JD, Choi SC, et al. Outcome after severe head injury: Relationship to mass lesions, diffuse injury and intracranial pressure course in pediatric and adult patients. *J Neurosurg* 1987;67:648-656.
40. Guidelines for the acute medical management of severe traumatic brain injury in infants, children, and adolescents: Intracranial pressure monitoring technology. *Crit Care Med* 2003;31: S444-S446.
41. Guidelines for the acute medical management of severe traumatic brain injury in infants, children and adolescents: Threshold for the treatment of intracranial hypertension. *Crit Care Med* 2003;31: S441-443.
42. Coles JP, Minhas PS, Fryer TD, et al. Effect of hyperventilation on cerebral blood flow in traumatic brain injury: Clinical relevance and monitoring correlates. *Crit Care Med* 2002;30:1950-1959.
43. Biswas AK, Scott WA, Sommerauer JF, et al. Heart rate variability after acute traumatic brain injury in children. *Crit Care Med* 2000;28:3939-3940.
44. Downard C, Hulka F, Mullins RJ, et al. Relationship of cerebral perfusion pressure and survival in pediatric brain-injured patients. *J Trauma, Infect, Crit Care* 2000;49:654-658.
45. Hackbarth RM, Rzeszutko KM, Sturm G, et al. Survival and functional outcome in pediatric traumatic brain injury: A retrospective review and analysis of predictive factors. *Crit Care Med* 2002;30: 1630-1635.
46. Kerr ME, Weber BB, Sereika SM, et al. Effect of endotracheal suctioning on cerebral oxygenation in traumatic brain-injured patients. *Crit Care Med* 1999;27:2776-2781.
47. Fortune JB, Feustel PJ, Weigle C, et al. Continuous measurement of jugular venous oxygen saturation in response to transient elevation of blood pressure in head injured patients. *J Neurosurg* 1994;80: 461-468.
48. Guidelines for the acute medical management of severe traumatic brain injury in infants, children and adolescents: Use of sedation and neuromuscular blockade in the treatment of severe pediatric

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49. Mazzola CA, Adelson PD. Critical care management of head trauma in children. *Crit Care Med* 2002;30:S393-S401.
50. Fisher B, Thomas D, Peterson B. Hypertonic saline lowers raised intracranial pressure in children after head trauma. *J Neurosurg Anesthesiol* 1992;4:4-10.
51. Zornow MH. Hypertonic saline as a safe and efficacious treatment

- of intracranial hypertension. *J Neurosurg Anesthesiol* 1996;8: 175-177.
52. Khanna S, David D, Peterson B, et al. Use of hypertonic saline in the treatment of severe refractory posttraumatic hypertension in pediatric traumatic brain injury. *Crit Care Med* 2000;28: 1144-1151.
  53. Nakayama SI, Kramer GC, Carlsen RC, et al. Infusion of very hypertonic saline to bleed rats: Membrane potentials and fluid shifts. *J Surg Res* 1985;38:180-186.
  54. Guidelines for the acute medical management of severe traumatic brain injury in infants, children and adolescents: Use of hyperosmolar therapy in the treatment of severe pediatric traumatic brain injury. *Crit Care Med* 2003;31:S456-460.
  55. Kaufmann AM, Cardoso ER. Aggravation of vasogenic cerebral edema by multiple-dose mannitol. *J Neurosurg* 1992;77:584-589.
  56. Chang BS, Lowenstein DH. Practice parameter: Antiepileptic drug prophylaxis in severe traumatic brain injury: Report of the Quality Standards Subcommittee of the American Academy of Neurology. *Neurology* 2003;60:10-16.
  57. Kieslich M, Jacobi G. Incidence and risk factors of post-traumatic epilepsy in childhood (letter to the editor). *Lancet* 1995;345:187.
  58. Shiozaki T, Sugimoto H, Taneda M, et al. Effect of mild hypothermia on uncontrolled intracranial hypertension after severe head injury. *J Neurosurg* 1993;79:363-368.
  59. Marion D, Penrod L, Kelsey S, et al. Treatment of traumatic brain injury with moderate hypothermia. *N Engl J Med* 1997;336: 540-546.
  60. Clifton GL, Miller ER, Choi SC, et al. Lack of effect of induction of hypothermia after acute brain injury. *N Engl J Med* 2001;344: 556-563.
  61. Biswas AK, Bruce DA, Sklar FH, et al. Treatment of acute traumatic brain injury in children with moderate hypothermia improves intracranial hypertension. *Crit Care Med* 2002;30:2742-2751.
  62. Taylor A, Butt W, Rosenfeld J, et al. A randomized trial of very early decompressive craniectomy in children with traumatic brain injury and sustained intracranial hypertension. *Child Nerv Syst* 2001;17:154-162.
  63. Dam Hieu P, Sizun J, Person H, et al. The place of decompressive surgery in the treatment of uncontrolled post traumatic intracranial hypertension in children. *Child Nerv Syst* 1996;12:270-275.
  64. Luerssen TG, Klauber MR, Marshall LF. Outcome from head injury related to the patient's age. *J Neurosurg* 1988;68:409-416.
  65. Tepas JJ, DiScala C, Ramonofsky ML, et al. Mortality and head injury: The pediatric perspective. *J Ped Surg* 1990;25:92-96.
  66. Thakker J, Splaingard M, Zhu J, et al. Survival and functional outcome of children requiring endotracheal intubation during therapy for severe traumatic brain injury. *Crit Care Med* 1997;25: 1396-1401.
  67. Tilford JM, Simpson PM, Yeh TS, et al. Variation in therapy and outcome for pediatric head trauma patients. *Crit Care Med* 2001; 29:1056-1061.
  68. White JRR, Farukhi Z, Bull C, et al. Predictors of outcome in severely head injured children. *Crit Care Med* 2001;29:534-540.
  69. Pigula FA, Wald SL, Shackford SR, et al. The effect of hypotension and hypoxia on children with severe head injuries. *Ped Surg* 1993; 28:310-314.
  70. Koskiniemi M, Kyykka T, Nybo T, et al. Long-term outcome after severe brain injury in preschoolers is worse than expected. *Arch Ped Adolesc Med* 1995;149:249-254.
  71. Spinella PC, Dominguez T, Drott HR, et al. S-100 beta protein serum levels in healthy children and its association with outcome in pediatric traumatic brain injury. *Crit Care Med* 2003;31:939-945.
  72. Townend WJ, Guy MJ, Pani MA, et al. Head injury outcome prediction in the emergency department: a role for protein S-100 B? *J Neuro Neurosurg Psychiatr* 2002;73:542-546.
  73. Yeates KO, Taylor HG, Wade SL, et al. A prospective study of short- and long-term neuropsychological outcomes after traumatic brain injury in children. *Neuropsychology* 2002;16:514-523.
  74. Max JE, Koele SL, Smith WL, et al. Psychiatric disorders in children and adolescents after severe traumatic brain injury: A controlled study. *J Amer Acad Child Adolesc Psychiatry* 1998;37: 832-840.
  75. Swift EE, Taylor HG, Kaugars AS, et al. Sibling relationships and behavior after pediatric traumatic brain injury. *J Dev Behav Ped* 2003;24:24-31.
  76. Wase SL, Taylor HG, Drotar D, et al. Family burden and adaptation during the initial year after traumatic brain injury in children. *Pediatrics* 1998;102:110-116.

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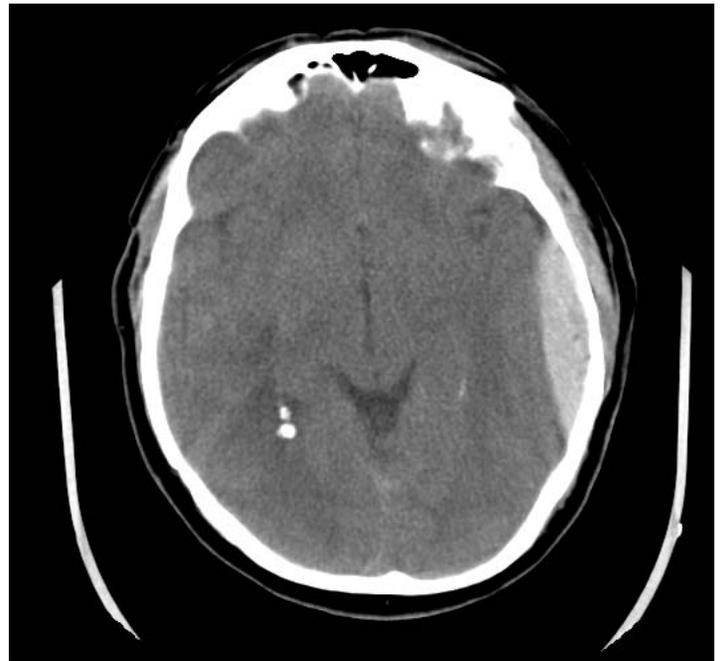


## CE/CME Questions

- Which of the following is true regarding a child younger than 2 years who sustains a head injury?
  - The younger the child, the higher the risk for traumatic brain injury.
  - The incidence of brain injury in a child younger than 2 years is about 5%.
  - CT scans do have certain disadvantages, including exposure to ionizing radiation.
  - All of the above
- A 3-month-old male presents after his mother dropped him when she tripped. He fell approximately five feet. He is irritable, but consoles and has a large parietal hematoma. The most appropriate next test is:
  - MRI.
  - CT scan of the head.
  - skull films.
  - skeletal survey.
- A 7-year-old male was involved in a fight at school four hours ago. He did not lose consciousness, remembers the entire event, and has had no vomiting. His neurologic examination is normal. On physical examination, he has a hematoma on his forehead. The next best test is:
  - an MRI.
  - a CT scan of the head.
  - skull films.
  - None of the above
- Which of the following has/have been associated with an intracranial injury in a child younger than 2 years?
  - Skull fracture
  - Parietal scalp hematoma
  - Large scalp hematoma
  - All of the above

## CE/CME Instructions

Physicians and nurses participate in this continuing medical education/continuing education program by reading the article, using the provided references for further research, and studying the questions at the end of the article. Participants should select what they believe to be the correct answers, then refer to the list of correct answers to test their knowledge. To clarify confusion surrounding any questions answered incorrectly, please consult the source material. **After completing this activity, you must complete the evaluation form provided and return it in the reply envelope provided in order to receive a certificate of completion.** When your evaluation is received, a certificate will be mailed to you.



- What is shown in the image above?
  - Epidural hematoma
  - Subdural hematoma
  - Intraparenchymal hematoma
  - None of the above
- Which of the following is *not* considered to be high-risk criteria for TBI in a child younger than 2 years?
  - Depressed mental status
  - Signs of depressed or basilar skull fracture
  - Two episodes of emesis
  - Acute skull fracture
- Which of the following children does *not* require a cranial CT following a fall?
  - A 3-year-old with an occipital hematoma, no other symptoms, and a normal exam
  - A 4-month-old who has a large scalp hematoma and is irritable
  - A 1-year-old who has a GCS score of 13
  - A 6-year-old with hemotympanum
- Which of the following are critical in the initial stabilization of a child with a head injury?

## CE/CME Objectives

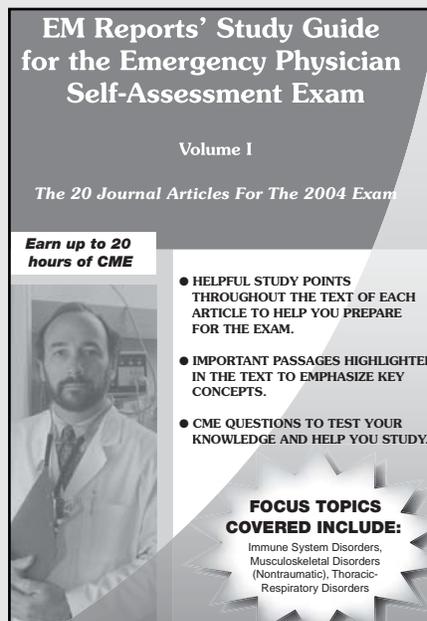
- Upon completing this program, the participants will be able to:
- Recognize or increase index of suspicion for pediatric head injury;
  - Identify how to correctly and quickly stabilize and manage pediatric head trauma;
  - Employ appropriate diagnostic modalities for pediatric head trauma; and
  - Recognize indications and potential risks with therapeutic options for children with head trauma.

- A. Avoiding hypoxia  
 B. Avoiding hypotension  
 C. Maintaining an adequate cerebral perfusion pressure  
 D. All of the above
9. In which of the following scenarios is ICP monitoring *not* an appropriate consideration?  
 A. A child with a GCS score less than 8  
 B. A child with a GCS score of 12 five minutes after a seizure  
 C. A child who was intubated at the scene, is unresponsive and has cerebral edema on CT scan  
 D. A child who is intubated for a multi-system trauma and must be paralyzed and sedated
10. Which of the following may be used in the management of a child with a head injury and a GCS score of 8?  
 A. Early intubation  
 B. ICP monitoring  
 C. Correction of hypotension  
 D. All of the above

**Answer Key:**

1. **D**      6. **C**  
 2. **B**      7. **A**  
 3. **D**      8. **D**  
 4. **D**      9. **B**  
 5. **A**      10. **D**

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