



Emergency Medicine Specialists, P.C. to Expand Emergency Services at St. John North Shores Hospital

By James M. Fox, M.D., F.A.C.E.P.

Commencing October 1, 2004, EMS, P. C. will be providing board certified emergency physicians 24 hours per day to staff St. John North Shores Hospital. The change is in direct response to increased patient demand in the growing suburb of Harrison Township.

"Patient volume has increased by 25% over the past two years", said Dr. Anthony Southall, President of Emergency Medicine Specialists, P. C. This has occurred without significant ambulance traffic as all Level I and II services were routinely rerouted to other emergency departments. With the enhanced expertise brought by the change in staffing, St. John North Shores Hospital is gearing up to accept these higher acuity visits.

Currently, North Shores has the ancillary services necessary to support a full service emergency department, what they have lacked is the inpatient bed capacity. While improvements in inpatient services are anticipated, most of the patients requiring admission will be sent to St. John Hospital and Medical Center approximately nine miles to the south.



"Patients obviously enjoy the service and convenience of the emergency department at North Shores Hospital", said Dr. Southall. Our aim is to expand the service while maintaining the historically high level of customer satisfaction that North Shores Emergency Department has long enjoyed. ♦

How Time Flies

By Raymond Rudoni M.D., F.A.C.E.P.

As of October 1, 2004, EMS will celebrate its two year anniversary providing emergency services at McLaren Regional Medical Center in Flint, Michigan. If I could use one word to describe the journey thus far, it would be "GROWTH".

Our fiscal year ended September 30, 2004, and volume is projected to be near 43, 500 (up from 41,200 the prior year or an increase of 5%).

So what is responsible for this growth? We are fortunate to have an outstanding group of both seasoned and new physicians and physician extenders, many of whom have relocated to

neighboring communities. Our nursing staff has new leadership, excellent morale, and provides professional, compassionate care.

Growth, however, would not be obtained without the continued relationship with the primary care community, pre-hospital providers and strong support from McLaren administration and supporting services.

We hope our 3rd year in Flint is as exciting and satisfying as the first two. Goals include: beginning a huge ED renovation in winter 2005 (which will more than double the size of our present ED), maintaining a strong relationship with our colleagues at Lapeer, and maintaining state-of-the-art emergency care for the community. ♦

Inside:

Pediatric Growth Plate Injuries

Receive Category I CME Credit from our medical article in each EMS Journal at www.emspecialists.com

Lapeer Regional Hospital

“Express Minute”

By Kenneth Parsons, M.D., M.P.H., F.A.C.E.P.

On August 1, 2004 Lapeer Regional Hospital and Medical Centers' Emergency Department Express Care opened. Staffed by physician assistants and LPN's, Express Care has treated nearly 700 patients since its inception. Current hours of operation are 3:30 pm - 11:30 pm utilizing four rooms shared with the cardiopulmonary service. With the current success, plans are in place to expand the hours of operation as well as the number of patient care rooms. Although we are about 20 minutes above our goal of a 90 minute turn-around, we are improving our efficiency every day and I am very proud of the staff and look forward to continued success.

August was a history making month for Lapeer Regional Hospital with over 600 admissions, and an ED volume hundreds above budget. With nearly 80 percent of the admissions coming from the ED, continued efforts in patient satisfaction has been a top priority. Ambulatory patients present to our ED typically in large boluses creating a backlog at our current triage area. We are near completion of renovating a larger area once occupied by patient registration. The new triage is significantly larger and will have two triage stations with easier patient access and the ability to flex up during high volume demands.

Over the past several months we have added clocks, informational grease boards that identify the nurse and physician caring for each patient, a poster that delineates the typical turn-around times for specific tests, and have televisions on the way. We are winning patients back one at a time. September patient volumes exceeded those of August. I thank the ED physicians, staff, administration, and everyone involved with the emergency department for their continued support and efforts in making Lapeer Regional Hospital Emergency Department a high quality department. ♦

Research Update

By T. Wayne MacGregor, M.D.

At St. John Hospital, we have an active research faculty with a wide variety of research interests. Our research director, Dr. Charlene Babcock Irvin, is active at both the regional and national level. She was formerly on the editorial board of Academic Emergency Medicine, and is chair of SAEM Healthy People 2010 and a member of the ACEP Public Health Committee. Her research interests include Public Health and ED Administration. Residency Director, Dr. Don Benson has a research interest in resuscitation. Dr. Curt Wimmer is currently studying invasive monitoring in critically ill patients and the utility of Doppler monitoring of patient's cardiovascular status to improve hemodynamic parameters. Dr. Wimmer also has an interest in ultrasound research. Dr. Doug Wheaton has a research interest in pre-hospital protocols, and Emergency Medical Services. Dr. Wheaton is beginning a protocol to study cerebral blood flow and oxygenation in out of hospital cardiorespiratory arrest, as well as in rapid sequence intubation. Dr. Robert Sills, our pediatric emergency medicine director, has an interest in toxicology and the practice of cost efficient medicine and is actively researching these topics. Dr. James Fox, who is very active in the administrative aspects of emergency medicine, is also active in administrative research.

Our residents are also actively involved in a variety of research projects. Each resident at St. John is required to complete one research project during their residency training under the supervision of one of our attendings. Dr. Dennis Bishop has presented his research on the Effects of Timing of Antibiotics in Patients with Community Acquired Pneumonia at several local and national meetings. Dr. Bishop won Best Resident Presentation at the Midwest Regional SAEM, as well as first place in St John's annual resident research symposium. Nearly all of the emergency medicine residents chose to present their research at one of the local, regional, or national emergency medicine meetings. This fall, Drs. Bishop, Gupta, Macneil, Dushaj, Coba and Holley will travel to Washington D.C. to present at the Mid-Atlantic SAEM conference. Dr. Macneil will present his research on Variation of Patients Left Without Being Seen Based on Day of the Week. Dr. Holley will present his initial work on Seasonal Variation of Gun – Related ED Visits. Dr. Coba will present his research on Prevalence of Surgical Interventions in Trauma Team Activations in Level I Trauma Centers. Additionally, Dr. Rocco and Dr. Coba will be presenting at the ACEP Research Forum this October.

Dr. Irvin's goal in getting residents involved in research is to 1) introduce them to the process of research, 2) involve them in their own project, and 3) pursue the opportunity for them to present in a regional or national forum. She believes research is fun, especially when it is not overwhelming. ♦

Emergency Medicine Specialists are Six Sigma Leaders



**James M. Fox, M.D.,
F.A.C.E.P.**



**Patricia Nouhan, M.D.,
F.A.C.E.P.**



**Robert B. Takla, M.D.,
F.A.C.E.P.**



**Curt Wimmer, M.D.,
F.A.C.E.P.**

By Catherine Vretta, M.D., MPH.

Four Emergency Medicine Specialist physicians at St. John Hospital and Medical Center have stepped up to lend their expertise and knowledge to the Six Sigma process. Six Sigma is a concept that was originally derived from manufacturing industries to improve quality. It is now being used in health care systems. Six Sigma refers to a statistical measure that expresses how close a service comes to its quality goals.

James M. Fox, M.D. has been named a Six Sigma Green belt. A green belt is considered a fully trained individual who applies Six Sigma skills to projects in their job areas. Patricia Nouhan, M.D. and

Curt Wimmer, M.D. will function as yellow belts, which is a designation that is new to the St. John Hospital and Medical Center's Six Sigma projects. Yellow belts receive specific Six Sigma training and support projects in their specific areas. General radiology turn-around times in the emergency department is the project that is currently being evaluated. A training session was held August 9th – August 12th and the radiology turn-around time will be re-evaluated in March. Robert Takla, M.D., is a yellow belt for St. John Oakland's emergency department. His project involves emergency department throughput time.

"Physicians are a critical part of any multidisciplinary work," says Ron LaPensee, Executive Vice President and Six Sigma Executive Sponsor. *"Having physician input on these teams also will help to accelerate the process of improving both clinical and business functions and providing better care to patients".* ♦

Welcome On-Board New EMS Physicians



Elizabeth Bascom, M.D.
St. John Hospital and
Medical Center and
Lapeer Regional Hospital



Anne Coatney, D.O.
McLaren Regional
Medical Center and
Lapeer Regional
Hospital



Wilma Henderson, M.D.
St. John Hospital and
Medical Center



Nick Lepora, D.O.
Lapeer Regional
Hospital and Lapeer
Regional Hospital



John B. Neumann, M.D.
McLaren Regional Medical
Center and Lapeer
Regional Hospital



Jeffrey T. Nigl, M.D.
St. John Hospital and
Medical Center



Michael A. Polito, D.O.
McLaren Regional
Medical Center



Bradley Smude, M.D.
McLaren Regional
Medical Center and
Lapeer Regional
Hospital



Vincent Valente, D.O.
McLaren Regional
Medical Center and
Lapeer Regional
Hospital

PEDIATRIC GROWTH PLATE INJURIES

By Renee A. King M.D.

Diagnosis and treatment of pediatric orthopedic injuries can be a challenge to the emergency department physician. These challenges are in large part due to the unique properties of the immature skeletal system. The physis or growth plate is unique to the pediatric bone. The physis, the area between the metaphysis and the epiphysis (which faces the area of joint articulation), contains proliferating cartilage cells. Compared with ossified bone, the physis has decreased mechanical strength which makes it vulnerable to injuries. Injuries can occur anytime prior to growth plate closure, but tend to occur during periods of rapid skeletal growth. Physeal injuries are uncommon, but if undetected can result in serious sequelae such as focal bone growth arrest. Fractures to the growth plate tend to occur in patterns, and understanding of these patterns may allow the ED physician to avoid oversights in diagnosis or treatment of these injuries.

Epidemiology:

Fifteen to thirty percent of all pediatric skeletal injuries are to the growth plate. These injuries usually occur after the age of 10 and are seen more often in boys than girls. The distal radius is the most common sight for physeal injuries (30%-60% of cases). These injuries tend to be seen between the months of April and September when children are more likely to be playing outdoors.

Pathophysiology:

The physis is the center of endochondral ossification, and its main purpose is rapid, integrated longitudinal bone growth. The growing physis has 4 distinct zones. They are (from epiphysis to metaphysis) the zone of resting cells, the zone of proliferating cells, the zone of hypertrophic/maturing cells and the zone of provisional calcification. The zone of hypertrophic/maturing cells is the weakest area and is the most likely area where a physeal fracture may occur. The physis receives its nutrients and blood supply from the epiphysis. Normal bone growth cannot occur if the blood supply is significantly disrupted.

Several classification systems to describe growth plate injuries are available, but the most widely used is the Salter-Harris classification system. This system is based on the extent of involvement of the physis, metaphysis, and epiphysis. There are 5 Salter-Harris categories. Higher Salter-Harris numbers represent increased chance of blood flow disruption and therefore increased chance of focal bone arrest and joint incongruity.

Salter-Harris Type I:

This type is seen mostly in infants and toddlers. The mechanism of injury is usually a shearing, torsion, or avulsion movement

which leads to a separation through the physis. Type I injuries account for about 6% of all physeal injuries. The prognosis is usually very good because there is no damage to the blood supply.

Salter-Harris Type II:

This fracture is the most common and accounts for about 75% of all growth plate injuries. The fracture runs from the physis to include a portion of the metaphysis. The metaphyseal bone fragment is often referred to as the "Thurston-Holland" sign. Like Type I injuries the prognosis is good because the epiphysis, which carries the blood supply, is not damaged.

Salter-Harris Type III:

This fracture is usually an intraarticular fracture of the epiphysis which extends into the physis. These fractures make up about 10% of all growth plate injuries. The prognosis is good but guarded because it depends on the amount of disruption to the blood supply. If there is increased fragmentation or displacement of the epiphysis then there is an increased likelihood that there is disruption of the blood supply which could lead to bone growth disturbances.

Salter-Harris Type IV:

A Type IV fracture begins at the articular surface, crosses the epiphysis, goes through the physis and extends into the metaphysis. This accounts for about 10% of physeal injuries and usually occurs at the lower end of the humerus. There is a risk of bone growth disturbance depending on the degree of damage to the epiphysis.

Salter-Harris Type V:

This fracture is the most likely to cause focal bone growth arrest, but fortunately it is the most uncommon (<1%). These fractures usually occur at sites in the lower extremity such as the knee or ankle. The mechanism of injury is a severe abduction or adduction that transmits significant compressive forces across the physis. The resultant axial compression crushes the physis and causes injury to the cells in the proliferative zone. Unfortunately these injuries are often identified retrospectively.

Diagnosis:

The history and physical examination are still the most important tools to making a diagnosis of physeal injury. The physician must ask about the mechanism of injury. A fall on an outstretched hand is a typical history seen with physeal injuries to the distal radius. Abduction, adduction, and twisting are commonly seen in lower extremity injuries. Also note that trauma does not have

CME Questions

to be acute. Repetitive stress can also damage the physis as seen with little league pitchers. Physical examination findings can be subtle, so point tenderness over the physis is reason enough to suspect a serious physeal injury. Type I and Type V injuries can be easily missed on plain radiographs so the history and physical are especially important in these injuries.

X-ray Findings:

The physis is radiolucent so injuries to this area are difficult to see on radiographs. The physician may not see any obvious abnormalities or may see only subtle findings like a widening at the physis in Type I injuries or joint effusions in Type V injuries. Types II, III and IV can usually be detected on X-rays. Contralateral comparison films can be helpful especially when findings are subtle.

Treatment:

The ED physician should first consider growth plate injuries rather than sprain with pediatric patients that have point physeal tenderness. It is also prudent to discuss with parents the possibility of growth abnormalities even with minor appearing injuries. The physician should explain that treatment is for a “worst case” scenario, and the child may not have a fracture, but that can only be determined after serial radiographs. Treatment for Type I injury is splint immobilization, intermittent icing, and elevation with outpatient orthopedic follow up. A type II injury without angulation or displacement has similar treatment to Type I. The patient should be splinted, advise to ice and elevate with a referral for outpatient orthopedic follow up. Type III injuries often need an orthopedic evaluation in the ED because of the need for anatomic alignment. If the blood supply is compromised the patient may require open reduction and internal fixation. Type IV injuries need ED evaluation by an orthopedist. There is an increased chance of open reduction with internal fixation. Even with appropriate reduction there is a significant risk of growth disturbances. Type V injuries have the worst prognosis. The physician should anticipate focal bone growth arrest. The orthopedist should be involved immediately. These patients should be casted and kept non-weight bearing.

Summary:

Orthopedic injuries are common in the pediatric population. Emergency department physicians must keep in mind growth plate injuries especially if the history and physical suggest it. Although bone growth abnormalities are rare, early recognition and appropriate management of physeal injuries can help the physician avoid this orthopedic pitfall. ♦

1. Which is the most common site for physeal injuries?

- A) proximal humerus
- B) distal radius
- C) ankle
- D) knee
- E) pelvis

2. What is the usual mechanism of injury for Salter-Harris Type I fractures?

- A) shearing, torsion, or avulsion movements
- B) abduction or adduction
- C) compressive forces across the physis
- D) axial load forces
- E) torque forces

3. Which Salter-Harris Fracture is most likely to cause focal bone growth arrest?

- A) Type I
- B) Type II
- C) Type III
- D) Type IV
- E) Type V

4. Which statement about X-ray findings with physeal injuries is true?

- A) physeal injuries may be missed because the physis is radioopaque
- B) X-ray findings are always more important than the history and physical exam
- C) The only sign of a Type I injury may be a widening at the physis
- D) contralateral comparison films are never needed
- E) Salter-Harris Types I, II, III, IV, and V are all easily seen on X-ray

5. Which statement about treatment of physeal injuries is true?

- A) Type I injuries need immediate orthopedic evaluation
- B) Type II injuries are most likely to cause growth disturbances
- C) Type IV injuries only need splinting, icing, elevation and outpatient orthopedic follow up
- D) Patients with Type V injuries are usually casted and kept non-weight bearing
- E) Type III injuries can be treated with pain control and outpatient follow up

References: American Board of Emergency Medicine web site.
Emergency Medicine Continuous Certification (EMCC)

St. John Hospital and Medical Center, an organization accredited by the MSMS Committee on Continuing Medical Education Accreditation, certifies that this activity meets the criteria for a maximum of one credit hour in Category I towards the requirements for Michigan licensure and of the Physician's Recognition award of the AMA provided it is completed as designated.

Questions & Comments

Emergency Medicine Specialists, P.C. is comprised of health care professionals who are committed to providing the highest level of medical care. EMS has specialized in emergency medicine, urgent care and after hours care for over thirty years. As a self-reliant professional corporation, EMS has become one of the industry leaders in southeast Michigan.

If you have any questions or comments regarding this publication or suggestions, please contact us at:

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The information contained within this journal is not intended to establish the standard of care for any physician or employee of EMS, or St. John Health, but only to provide generalized education with respect to healthcare issues which arise in our profession.

October Calendar

- 6)** MCEP, Board of Directors Chapter Office, Lansing, Michigan
- 15-16)** ACEP Council Meeting, San Francisco, California
- 17-20)** ACEP Scientific Assembly, San Francisco, California
- 21)** EM/Surgery Trauma Conference, St. John Hospital and Medical Center
7:00 Lower Level Conference Room
- 27)** St. John Hospital EM Staff Meeting *8:00 Classroom C*
- 27)** St. John Hospital EM Faculty Meeting *10:00 Classroom C*

November Calendar

- 2)** McLaren Regional Medical Center, Department Meeting *8:00, ED Conference*
- 3)** MCEP, Executive Committee Chapter Office, Lansing, Michigan
- 4)** Lapeer ER Section *7:30 AM Dining Room A&B*
- 11)** McLaren Regional Medical Center, Staff Meeting *6:00 PM, Ballenger Auditorium*
- 18)** EM/Surgery Trauma Conference,
St. John Hospital *7:00 Lower Level Conference Room*
- 22)** Lapeer Department of Family Medicine Meeting *6:00 PM ACR 4&5 A&B*
- 22)** Lapeer Quarterly Medical Staff Meeting *7:00 PM ACR 4&5*
- 24)** MCEP, Resident's Assembly, Sheraton Hotel, Lansing, Michigan
- 24)** St. John Hospital EM Staff Meeting *8:00 Classroom C*
- 24)** St. John Hospital EM Faculty Meeting *10:00 Classroom C*

December Calendar

- 1)** MCEP, Board of Directors, Chapter Office, Lansing, Michigan
- 7)** St. John Hospital Quarterly Staff Meeting *6:30 Hospital Auditorium*
- 16)** EM/Surgery Trauma Conference,
St. John Hospital *7:00 Lower Level Conference Room*
- 22)** St. John Hospital EM Staff Meeting *8:00 Classroom C*
- 22)** St. John Hospital EM Faculty Meeting *10:00 Classroom C*



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