media, and government offered invaluable advice by identifying spheres of political action, some guiding principles, and lobbying strategies. Senator Lucie Pepin, the government representative summarized by saying "you have to make yourself heard, your power belongs to you, don't let anyone take it away."

I wish more perioperative nurses had been there, to be motivated by such powerful messages, and to be given the incentive to become more active in promoting our specialty and our profession. In two other sessions, a discussion group on human resource planning and nursing recruitment and in a presentation to nursing students by specialty groups (in which we participated representing ORNAC), it became clear that there is so much more work to do in educating others (even nurses) about perioperative nursing.

In conclusion, to quote Lynda Kushner Pekrul, CNA's new President, "That nurses today make a difference is a given, that nurses can and will make even more of a difference within the future and changing health care system is inevitable - we just have to get on with it!" **Carpe Diem!**

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1998 Standards Note

A typographical error on page 167, the position should read as follows:

Lateral Rt. - patient lying on the right side
Lateral Lt. - patient lying on the left side

The Standards Committee wishes to apologize for any inconvenience this may have caused.

Transient Osteoporosis During Pregnancy: The Perioperative Nurse's Role

By Antoniette Labricciosa R.N., B.Sc.N., CPN(C)

Perioperative nurses are confronted with ever changing demands in their daily practice. Perhaps the greatest challenge is in the care of patients with multi-faceted health care problems. These patients require the coordination of many multi-disciplinary health care team members in achieving optimum health.

This paper will describe the etiology and a case study of a patient with transient osteoporosis during pregnancy. The disease process known as transient osteoporosis, the regime of treatment, and the role of the perioperative nurse in coordinating the patient's perioperative care will be discussed. The patient is a 28-year old, 26-week primip who presented to a tertiary health care centre with spontaneous bilateral fractures of the hip of unknown origin. The complexity of the case, that is, unilateral versus bilateral, was further complicated by the information that the patient was in the early part of the third trimester of pregnancy when she presented to hospital with bilateral displaced subcapital femoral neck fractures.

A chart review revealed that the patient had started to develop pain in her left groin two months prior to presentation to hospital. Two weeks after the initial onset of pain, she started experiencing pain in her right groin. Over the next two months, the pain progressed to the point where the patient was unable to walk, even when using a walker. She was mainly wheelchair bound for one-and-one half weeks prior to hospitalization. Unfortunately, and while at home alone, the patient collapsed while in the shower. She was able to get herself into a squat position, but no farther. She was found in this same position several hours later by a family member.

Radiologic films were taken immediately upon presentation to the local hospital and revealed completely displaced fractures of the neck of both femurs. The x-rays also demonstrated osteoporosis in the proximal femurs of both hips. A physical exam revealed no evidence of generalized metabolic bone disease or hyperparathyroidism. The patient's history was negative for any bone abnormalities, fractures, endocrine abnormalities, renal problems, cardiac and respiratory problems, or previous surgery. The patient also presented with decreased flexion and extension of both hips, and decreased external and internal

Abstract

Perioperative nurses are confronted with ever changing demands in their daily practice. Perhaps the greatest challenge, however, is in the care of patients with multi-faceted health problems. These patients require the coordination of many multi-disciplinary team members in attempting to achieve optimum health.

This paper will describe the case study of a 28 year old, 26 week primip, who presented to a tertiary care centre with spontaneous bilateral hip fractures of unknown origin. It will further discuss the disease process known as Transient Osteoporosis during Pregnancy, the surgical approach, and finally, the role of the perioperative nurse in coordinating the patient's perioperative care.

Author

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rotation of both lower limbs.

The differential diagnosis based on the patient's physical exam and clinical findings included osteoporosis, tumour of the femoral necks, and metabolic bone disease. The medical plan of action included admission for surgical repair of both hips and consultation with the High Risk Obstetrical Service, Anaesthesia, Endocrinology, and Occupational Therapy.

Consultation with Other Disciplines

Once surgery was decided upon, the challenge for the perioperative nurses was in the difficulty of coordinating the resources required to meet the complex needs of the patient. The recurring common denominator, as resources were coordinated, was that the patient was physiologically, vastly different from the usual patient population undergoing surgical repair of femoral neck fracture. This patient was young, healthy, and 26 weeks pregnant. In attempting to provide exceptional perioperative care to both mother and baby, several multidisciplinary team members were consulted. The coordination and collaboration which ensued provided for excellent theory and research-based care.

Hawkins (1995), in an article entitled, "Anaesthesia for the Pregnant Patient Undergoing Non-Obstetrical Surgery," suggests that surgery during pregnancy is not an uncommon event.

Many procedures, including ovarian cystectomy, appendectomy, and cervical circlage, have been performed successfully during pregnancy. One of the major goals in maximizing the safety of both the mother and fetus is the prevention of preterm labour. Mechanical shifting and trauma to the uterus, often encountered during abdominal and pelvic surgeries, may initiate postoperative premature labour and potentially, fetal death. Measures must also be taken to maintain fetal well-being during the perioperative period. Placental blood flow, for example, decreases with maternal hypotension, pain or apprehension. Avoidance of hemodynamic changes, such as hypotension, and decreasing the mother's response to pain stimulus, fear, and anxiety, are primary goals for the care providers. The perioperative nurses, as members of the multidisciplinary team, implemented interventions which were aimed at achieving an optimum fetal environment, prevention of preterm labour, and support of the mother's physiological and psychological needs.

The patient was transferred from the unit to the holding area of the Operating Room on her bed. It had been decided between the nurses on the patient unit and the nurses in the O.R. that not moving the patient to a stretcher would assist in maintaining her comfort level, this despite the fact that the patient verbalized the ability to mobilize quite easily. The patient's husband accompanied her to the O.R. and expressed a wish to remain with his wife. The holding area was vacant except for this patient. This request was readily agreed upon as it was felt that this would assist in maintaining the patient's emotional well-being.

Minimizing the Patient's Pain, Fear, and Anxiety

Upon arrival to the preoperative holding area, the patient was routinely admitted to the O.R. Her identity was confirmed, and the chart reviewed for the appropriate surgical consent, NPO status, laboratory test results, and existing food and drug allergies. The patient was able to verbalize a complete understanding of the planned procedure, and her questions regarding anaesthetic and surgical outcomes were directed to and answered by the anaesthetist and surgeon respectively. She went on to describe that this was a much wanted pregnancy, but that she had no idea that the pregnancy would result in the fracturing of both her hips. She was quite concerned about the baby's well-being intraoperatively. Her fears were allayed by providing her with relative information regarding the safety on the anaesthetic and the measures which would be taken to ensure the baby's safety during her surgery. This included explaining to the patient that she was well beyond the first trimester, or the period when the fetus is most susceptible to teratogenic factors. Once again, the goal was to minimize the patient's anxiety.

In addition to admitting the patient, Radiology, Obstetrics, Anaesthesia, Surgery, and the Post Anaesthetic Care Unit nurse (PACU) were assembled. A radiology technician had already prepared and assessed the functioning of the Image Intensifier C-Arm and monitor to be used for the intra-operative fluoroscopy. The major concern was the potential damage to the still developing fetus (at 26 weeks) from radiologic imaging. According to documentation in the literature, proper shielding permits exposure with a decreased risk to the fetus, as compared to non-shielding (Brodell et al., 1989). The technician suggested not only placing a lead apron over the patient's abdomen, but also suggested the placement of one under the patient's torso. This was done in an attempt to maximize protection of the fetus from the radiation emitted during the procedure, both in the lateral and AP (Anterior-Posterior) positions. Intraoperatively, exposure was limited by allowing the x-ray technician to expose (control) the fluoro image. This would assist in decreasing any excessively long exposure time in the lag period between the decision to fluoro and the action, if it had been performed by the surgeon.

An obstetrician and resident on call had assessed the patient preoperatively. The decision was made not to provide external fetal monitoring in the O.R., but to have monitoring in the PACU. The PACU nurses arranged for a fetal monitor from our Labour and Delivery Unit for the immediate postoperative period. A Labour and Delivery Unit nurse would supervise the locating of the fetal heart, application of the monitor, and would remain with the patient until a base line fetal heart rate was established.

Anaesthetic Consultation and Assessment

The anaesthesia requirements were based on the preoperative anaesthetic consult and assessment of the patient, and the needs of the patient during the periopertive period. The pros and cons of general and regional anaesthesia were discussed with the patient and her husband. The goal of the anaesthetic was to avoid maternal hypotension, hypercarbia, and hypoxia, and minimize pain response. The normal sympathetic response to pain and anxiety is an increase in catecholamine release. This increase, in turn, results in maternal vasoconstriction and constriction of the uterine and placental vessels. A decrease in uterine blood flow and perfusion can potentially lead to fetal acidosis, hypoxia, fetal distress, and/or fetal death (Hawkins, 1995). In order to minimize the possibility of hypoxia and its potential adverse effects on both the mother and baby, a combined general and regional anaesthetic was decided upon. The advantages of the regional anaesthetic (epidural) included its safety, a decrease in blood loss intraoperatively, a minimizing of the total amount of general anaesthetic required, and therefore, a minimizing of fetal drug exposure, and finally, the ability to extend the effects of analgesia into the postop phase without the administration of large amounts of narcotics. The general anaesthetic, with its controlled ventilation, provided assurance of adequate oxygenation of the mother. It was also an excellent option due to its relative safety for mother and baby, the ability to provide intraoperative muscle relaxation, and the mother's preference to be asleep in view of the potential length of the surgery.

Two Separate Instrument Set-Ups

After consulting the orthopaedic surgeon and based on the sarcoma program protocol, it was decided that two separate instrument set-ups should be prepared and utilized. This would eliminate the potential for contamination between operative sites, as the underlying pathology and origin of the fractures were still undetermined. The fracture table and its necessary accessories were placed in the appropriate position for bilateral surgery and positioned in the O.R. to meet the needs of both the surgical and nursing staff. This was an additional task for nursing, as there were no ancillary support staff on the weekends and evening shifts.

Once all the multidisciplinary team members had been consulted and the room was prepared, the patient was transferred to the O.R. She was able to mobilize surprisingly well. The patient was easily transferred from her bed to the fracture table using her upper body, and with the assistance of the operative team. Routine monitoring included the application of ECG leads, pulse oximeter, and automatic blood pressure cuff. These monitors, coupled with end-tidal $C0_2$ and $FI0_2$ monitors, provided additional assurance that the maternal/fetal environment was optimal. An I.V. was started with Y-blood tubing through a blood warmer. It is important to monitor fluid/volume status in the event of excessive blood loss and the possibility of maternal hypotension. The patient was turned to the lateral position and given an epidural. Once returned to the supine position, the patient was administered a general anaesthetic using the rapid sequence induction technique. Delayed gastric emptying and displacement of the gastroesophageal junction increase the potential for aspiration during induction in pregnant women. Some anaesthetists would suggest administering an oral antacid as a pre-medication.

This often helps combat 'heartburn' and regurgitation symptoms many women experience, and may be used as a prophylactic agent against aspiration pneumonitis (Hawkins, 1995). A foley catheter to straight drainage was inserted. Following induction, the nursing and radiology personnel placed lead aprons over and under the patient for maximum shielding of the baby. Warm blankets were placed over the patient's upper body and head. The patient was positioned on the fracture table by the surgical team for fixation of

the left femoral neck, followed immediately by re-prepping and draping, and sterilization of specialty instruments for the repair of the right femoral neck. The contralateral limb was placed in extension on the fracture table.

Case Challenges

While the patient's intraoperative course was normal and uneventful to this point, the challenges to the perioperative nurses continued. The perioperative nurses had been able to assemble two sets of complete basic orthopaedic set-ups; but the instruments required sterilization between the two fixations as only one set of hip pinning instrumentation is owned by the institution. Additionally, it was necessary to confirm that duplicates of all potentially implanted plates and screws were available. Initial and final counts, positioning and repositioning the patient's legs in traction, scrubbing, prepping, and draping, rescrubbing, gowning and gloving, changing instruments and setups, attending to the anaesthetist, and moving the C-arm and monitor, were just a few of the activities that contributed to the normal intraoperative nursing actions. Femoral reamings from both the right and left femoral head were sent to pathology for tissue diagnosis. Hemovac drains were inserted, one to each operative site. The wounds were closed and dressed with pressure dressings. The patient was transferred via her own bed to the PACU.

Upon arrival in PACU, routine monitoring plus fetal monitoring was implemented. The patient exhibited good motor and sensory response in her lower limbs with no numbness. CSM (circulation, sensation, and movement) were reported as good and dorsalis pedal pulses were felt bilaterally and strong. The fetal heart tracing was examined by the obstetrical resident and showed good long and short term variability with no decelerations. The rate was 150-160 beats per minute.

The patient's postoperative course of recovery was speedy. The drains and foley were discontinued postoperative day 2. The epidural was removed postoperative day 3 with pain management continued by oral analgesics. Fetal monitoring continued twice daily throughout her postoperative stay in hospital. Extensive occupational therapy consults prepared the patient and her family for her discharge home and managing the activities of daily living with non weight-bearing limitations until and after the baby was born.

Pathology reports indicated that both the right and left reamings showed marked haemorrhagic changes which were compatible with osteonecrosis. There was no evidence of inflammation or malignancy in either sample. The diagnosis of transient osteoporosis in pregnancy with superimposed pathological fractures of the hips bilaterally was established by exclusion of other possible diagnosis.

The patient was booked for an elective caesarian section at 39 weeks due to the less than optimal surgical fixation. However, the baby was in the breech position, and the patient experienced a spontaneous and premature rupture of membranes at 37 weeks. A caesarian section was performed, and a healthy baby boy with Apgars of 9 and 9, weighing 3629 grams, was delivered.

Disease Discussion and Treatments

The irony of this case study is the fact that the picture most often associated with osteoporosis is a very different patient from the patient in this scenario. Osteoporosis, in the classic sense and as it is understood, is a disease process whereby bones lose strength, bone density, and become fragile to the point where fracture may occur. In both men and women, bone mass reached its highest level in young adulthood between the ages of 30 and 35 years old. There is then a steady decline in bone mass after this age. Women experience a more accelerated bone loss than men. This loss, as shown in recent studies, is a result of estrogen deficiency. Declining estrogen levels have been indicated as the major cause of bone loss during the first twenty years after menopause. In fact, by the time women reach 90 years old, they will have experienced a loss of 20% of their cortical bone mass as compared to less than 5% bone loss in men (Riggs and Melton, 1988).

Osteopenia is the term used to identify a decrease in bone density or mass. Bone mass, in turn, can be affected by several factors. These include genetics, endocrine, and nutritional and mechanical determinants.

In terms of mechanical factors, it can be assumed that bones and muscle are quite similar. Muscles will atrophy when not used or exercised. This theory has been suggested as a means of preserving bone mass, as well.

Vitamin D and Calcium are important in bone growth and maintenance. Our bodies require these important nutritional components both during the building of our skeletons, and later in life when our intake is insufficient to meet the body's needs for vitamins and minerals. But the body's regulating mechanisms will function so as to maximize the availability of extracellular calcium, even at the expense of breaking down our skeletal stores. Even previous surgeries, as thyroidectomy and gastrectomy, can either affect the amount of calcium produced or the absorption of Vitamin D and Calcium (Riggs and Melton, 1988).

Fractures which result due to osteoporotic bone occur at common sites. These include the neck and intertrochanteric regions of the proximal femur and the vertebral body. Most hip fractures occur among older people (about 90%), and are the result of mild trauma, as a fall to the floor. Hip fractures are more uncommon in the young person, and are usually associated with severe trauma, like car accidents. The National Osteoporosis Foundation (1996) identifies several risk factors for developing osteoporosis. Those risk factors include age, gender, race, bone structure and body weight, onset of menses/menopause, family history, medications and disease. In women, bones also weaken with age faster because women have less bone tissue than men. Women who are small-boned and small in size, those who smoke, drink, do little or no weight bearing exercise, have a family history of osteoporosis, or those with specific endocrine disorders, are at risk for developing this disease.

A recent review of medical literature on the topic of transient osteoporosis in pregnancy describes a disease process which is quite different than the description of osteoporosis provided by the National Osteoporosis Foundation.

Case Studies

Brodell et al.,(1989), in the Journal of Bone and Joint Surgery, describe two cases of TOH (Transient Osteoporosis of the Hip) complicated by fractures. The first case involved a 31 year old multip (G2P2) admitted to hospital during the 30th week of pregnancy with a two month history of increasing pain in the groin and medial right thigh. She had limited range of motion and it had become increasingly difficult to weight bear. Radiological findings demonstrated significant osteopenia and bone loss of both femoral head and neck. After a week of bedrest and buck traction to the right lower limb, she was discharged home on crutches and non weightbearing on the right leg. While the right side improved, the left hip became painful. The patient was confined to a wheelchair until the delivery of a healthy baby boy. Radiological films at one month post partum showed healing bilateral superior rami fractures and improved density in both hips.

The second case describes a 31 year old primip who presented with increasing pain to the right groin starting at five months gestation and progressing throughout the duration of the pregnancy. Two days post partum, xrays of the pelvis showed advanced osteopenia of the right femoral head, neck, and acetabulum with subcapital fracture. The patient eventually underwent surgery using a nail and side plate for fixation with good results.

The authors of this article suggest that almost all of the documented cases of TOH have been women in their late twenties to early thirties. The women were usually in their third trimester of pregnancy. The clinical picture consists of severe pain which develops in the groin and thigh. Associated pathological fractures may occur. The radiological findings are consistent with severe osteopenia which may involve the hip, pelvis, or spine. Clinical laboratory findings are normal. Patients show marked improvement after delivery of the baby.

What causes Transient Osteoporosis during pregnancy?

Several theories are identified in this article suggesting a cause for TOH. One theory hypothesizes that the increased need for calcium during pregnancy and for lactation can increase the demand on the maternal skeletal stores. The argument, however, is that even severely malnourished women are physiologically able to provide adequate amounts of calcium for the developing fetus. This is achieved by means of complex hormonal regulating mechanisms, and by the fact that calcium and Vitamin D supplementation, and increasing intake of high calcium foods and beverages (milk) are encouraged during pregnancy (Dunne et al., 1993).

Some other theories suggest viral, inflammatory, arthritic, or traumatic underlying factors. In addition, it has been suggested that the increasing body weight of the third trimester might cause undue stress on the acetabulum and pelvis. This theory is also debated due to the fact that bones are not static. Bones are able to dynamically adjust to the use and stressors to which they are subjected (Brodell et al., 1989).

An additional report identifies a Japanese woman who had osteoporotic hip pain which resolved immediately following a therapeutic abortion in the first trimester. This report suggests that both hormonal and endocrine factors may be involved in this tran

sient process (Brodell et al., 1989).

Another interesting finding, as documented in an article entitled "Pregnancy Associated Osteoporosis", is the reported higher incidence of fracture at a younger age in the mothers of TOH patients as compared to a control group. Sixteen mothers of the 29 women found to have pregnancy induced osteopenia, as compared to 7 mothers of women in the control group, were found to have had fractures. The majority of those mothers fractured before 45 years of age. The theory in this article is based on the question of a potential genetic link in identifying this as a pre-existing condition (Dunne et al., 1993).

While many theories have been suggested in determining the cause of TOH, the condition, its treatment and prevention remain a puzzle. There appears to be limited documentation of TOH in the literature. In fact, Goldman et al., (1994), in the International Journal of Gynaecology & Obstetrics, suggests that the number of reported cases is 53. This small number may be the result of the fact that common complaints of pregnant women include hip and back pain, and these complaints are regarded as part of the normal progression of pregnancy. The reluctance to order radiological imaging during pregnancy has also made diagnosis difficult. The International Commission on Radiation Protection stresses the need to keep radiation doses to unborn children as low as possible. Studies have suggested a possible link between prenatal radiologic exposure and an increased risk of childhood cancer. Recommended practices for employees include decreasing the amount of time spent in the radiation area and proper shielding. In the case of the patient in discussion, intraoperative shielding and exposure limiting, and postoperative films with abdominal and pelvic shielding, also assisted in lowering these risks.

Conclusion

The question remains as to whether pregnancy is indeed a causative factor or a poorly timed event in the progression of TOH. While many theories have been identified, the priorities for the perioperative nurse in treating the pregnant patient remain well-defined. These include minimizing the patient's pain, fear, and anxiety. Reassuring the patient regarding the safety of the anaesthetic and surgery are measures which can reduce the patient's apprehension, especially in the preoperative phase. Minimizing aortocaval compression by means of uterine displacement, achieved by placing a roll under the right side of the patient's torso, is one way of promoting adequate blood flow to the fetus. Fetal monitoring intraoperatively can also be an excellent indicator of the mother's oxygenation and pressure. Perhaps the most important priority for the perioperative nurse is in the consultation with other health disciplines. Actions such as intraoperative fetal monitoring and patient positioning resulting in uterine displacement, are not always possible. These are often dictated by the type and nature of the surgery.

Preoperative planning with anaesthesia, surgery, patient unit and PACU nurses, and obstetrics, can amalgamate the multitude of ideas which will optimize the surgical experience for the patient and the fetus.

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Overheard in the OR...

Tell me what you need, and I'll tell you how to get along without it !

Predicting Difficult Airway Access in the Preoperative Clinic

By Sue Leddy, R.N., B.Sc.N., C.P.N.(C)

Recent changes in the health care system have led to more complex surgeries being done on more complex patients on a day surgery basis. To ensure adequate preoperative assessment, screening, testing, and preparation of surgical patients, the Pre-Admit Clinic has evolved.

At the Pre-Admit Clinic, the following data is collected and reviewed:

- surgeon's physical and history
- surgical consent
- patient history (using Pre-Anaesthetic Questionnaire)
  - prior surgeries and anaesthesia
  - list of medications, allergies
  - social history
- review of systems
- physical examination
  - vital signs
  - height and weight
  - cardiac and respiratory system examination
  - any other system examination warranted by the history
- laboratory testing (condition specific)
- investigative tests if required based on patient's conditon
  - EKG
  - Pulmonary Function Test
  - Chest X-Ray

The Pre-Admit Clinic nurse ascertains the patient's present health status, and the stability of any existing problems. Referrals to the anaesthetist are made as necessary, for further investigation, perioperative risk assessment, and/or anaesthetic management planning.

In addition, the Pre-Admit Clinic nurse intervenes to reduce patient anxiety through education. The patient is taught regarding:

- anaesthesia method of choice
- preoperative preparation required (shaves, scrubs, preoperative medication, etc.)
- intra-operative procedures
- postoperative care including pain control, activity, diet, dressing and wound care and follow up.

One area of assessment at the Pre-Admit Clinic that has been slower becoming established is that of preoperative Airway Assessment, to predict the difficulty of airway access and management in the Operating Room. Often the patient is not seen by the Anaesthetist until the moment of surgery, and planning and management of difficult airway is not facilitated in this way. The Pre-Admit Clinic offers the opportune time for a full Airway Assessment to occur.

Estimates of the incidence of difficult intubation under controlled conditions in the Operating Room vary widely, depending on the definition used, patient population studied, and skill of the operator. The frequency of failed intubation is thought to be approximately 1 in 500, (Deem and Bishop, 1995). These failures also increase the patient's risk for morbidity and mortality.

Author

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