

**FEMALE PELVIC SURGERY
VIDEO ATLAS SERIES**

MICKEY KARRAM, SERIES EDITOR



Management of Acute Obstetric Emergencies

Baha M. Sibai



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Acute Changes in Fetal Heart Rate Tracing: When It Becomes an Emergency; Management of Severe Sepsis and Septic Shock; Management of Hypertension Including Stroke, Subcapsular Liver Hematoma

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MANAGEMENT OF ACUTE OBSTETRIC EMERGENCIES

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Preface

Acute medical and surgical emergencies in pregnancy and postpartum are the leading cause of maternal mortality and morbidity worldwide. During the past decade there has been a substantial increase in the incidence of these emergencies. Secondary to the change in demographics of women considering pregnancy as well as a change in obstetric practice, these emergencies are expected to continue to increase. Specifically many women are delaying pregnancy until they are in their 40s. Couple this with an epidemic of obesity as well as rising cesarean section rates (with a tremendous increase in repeat cesarean section) and one can easily understand why these emergencies will continue to commonly occur. Also due to an improvement in medical and surgical care and advances in medical technology, many women with serious preexisting medical and surgical disorders are now surviving to reproductive age and are capable of pregnancy.

Specific emergencies that have resulted from these changes in maternal demographics and obstetric practice include an increased rate of life-threatening hemorrhage (both antepartum and postpartum), cardiovascular complications (pulmonary embolism, edema, cardiomyopathy, amniotic fluid embolism, and cardiorespiratory arrest), severe life-threatening hypertensive emergencies (eclampsia, stroke, liver hemorrhage), sepsis, and septic shock.

Due to an increased likelihood of these life-threatening obstetric emergencies, it is important that obstetricians as well as health care providers in general be prepared to deal with such emergencies.

There are several textbooks on medical complications during pregnancy and critical care obstetrics. However, this book is unique in that it focuses on acute maternal emergencies in labor and delivery, postpartum, emergency room areas, and intensive care.

The goals are to provide a step-by-step approach to the diagnosis and management of these emergencies with emphasis on anticipation and preparation in the form of education and development of protocols. It also emphasizes the need for a multidisciplinary team approach to deal with these emergencies. The format of the book uses case presentation with expert discussion using photographs, illustrations, and algorithms to highlight appropriate management of the various emergencies presented.

For most of the covered topics, video clips are present in the accompanying DVD, in the hope of augmenting the text. The DVD contains numerous PowerPoint presentations, surgical procedures, and instructional videos on a variety of topics. Included is a unique video demonstration of how to appropriately manage maternal cardiac arrest in pregnancy, including techniques of cardiopulmonary resuscitation.

I hope the information contained in this textbook will result in improved pregnancy outcomes for all women worldwide.

Baha M. Sibai, M.D.

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Epidemiology of Acute Obstetric Emergencies

1

Baha M. Sibai M.D.



Video Clips on DVD

1-1 PowerPoint Discussion of
Epidemiology of Acute Obstetric
Emergencies

The incidence of acute medical and surgical emergencies in pregnancy and postpartum has increased during the past decade, and is expected to continue to increase in the future. This increase has resulted from the change in demographics of women who are pregnant or considering pregnancy (Table 1-1), as well as the change in obstetric practice (Table 1-2). Pregnancies in women 40 years and older (about 3%) are much more common than they were 10 years ago. Indeed, seeing women who are pregnant at age 50 or more is not an infrequent occurrence. This is related to the fact that more women are delaying getting pregnant to a later age (personal choice) or starting a new family (change in paternity). The availability of assisted reproductive technologies also has had an effect. With advanced maternal age there are increased rates of chronic hypertension, obesity, type 2 diabetes mellitus, preeclampsia, placenta previa, and abruptio placentae. In addition, these women are more likely to have multifetal gestation because of the need for assisted reproduction, and more likely to require cesarean delivery. The frequency of multifetal gestation among all pregnancies in the United States is 3.5%.

The percentage of pregnant women who are obese or morbidly obese (20% to 30%) has also increased during the past decade. Obesity is associated with increased incidence of hypertensive disorders of pregnancy, type 2 diabetes mellitus and gestational diabetes, cesarean section, cardiopulmonary complications, anesthetic challenges, and wound infections/sepsis. The percentage of women who are pregnant for the first time is also increasing; these women are at increased risk for all types of hypertensive disorders, and are more likely to have elective induction of labor as well as emergency cesarean section.

A major contributor to medical and surgical emergencies is the increasing number of pregnant women with preexisting serious medical disorders (see Table 1-1). Because of improvements in medical and surgical care and advances in medical technology, pregnancy in women with severe cardiopulmonary disease and end-stage renal disease is more frequent than it was a decade ago.

Table 1-1 Factors Increasing Incidence of Medical and Surgical Emergencies in Obstetrics

- Change in maternal demographics
- Advanced maternal age ≥ 40 years
- Obesity (body mass index [BMI] >30 kg/m²)
- Increased percentage of multifetal gestation (3.5%)
- Increased percentage of nulliparity
- Pregnancy with chronic medical disorders
 - Long-standing chronic hypertension
 - Pregestational diabetes mellitus
 - Complicated cardiac disease
 - Severe renal disease or end-stage disease
 - Severe cystic fibrosis
 - Solid organ transplants
 - Stroke

Table 1-2 Change in Obstetric Practice

- Elective induction of labor
- Elective cesarean section
 - Primary and repeat
- High-order cesarean section (≥ 3)
 - Placenta previa and abruptio placentae
 - Placenta accreta/percreta
 - Uterine rupture
 - Cesarean hysterectomy
 - Blood transfusion (≥ 4 units)
- Multifetal gestation
 - Severe preeclampsia
 - Preterm labor, tocolytics
 - Prolonged bed rest
 - Uterine overdistention
 - Invasive procedures
 - Cesarean hysterectomy

The recent changes in obstetric practice have also led to an increased incidence of medical and surgical emergencies. The increased rates of elective cesarean section (primary on maternal request) and repeat cesarean sections have led to increased number of pregnant women with three or more cesarean sections. In addition, the presence of previous cesarean section increases the risks of placenta previa, abruptio placentae, and placenta accreta and percreta. These latter complications are more likely to result in massive blood loss, disseminated intravascular coagulopathy, cesarean hysterectomy, need for ventilatory support, and admission to an intensive care unit (ICU).

Multifetal gestation is associated with increased rates of placental abnormalities, preeclampsia, and preterm labor. In addition, uterine overdistention increases the risks of preterm rupture of membranes, abruptio placentae, and uterine atony. These women require prolonged periods of bed rest, which increases their risk for thromboembolism. Women with multifetal gestation with preterm labor requiring tocolytics and steroids for fetal lung maturity are also at increased risk for pulmonary edema and cardiomyopathy. Moreover, patients with multifetal gestation are more likely to require invasive diagnostic and therapeutic procedures such as cervical cerclage, serial amnioreduction, or fetoplacental surgery, procedures associated with an increased rate of obstetric emergencies.

Table 1-3 Steps for Successful Outcome for Management of Obstetric Emergencies

- Identify patients at risk (red alert)
 - Antepartum
 - Intrapartum
 - Postpartum
- Develop mandatory policies and procedures
 - Nurses
 - Physicians
- Mandatory training in obstetric emergencies
 - Advanced life support in obstetrics
 - Management of obstetric emergencies
 - Fire drills for infrequent emergencies
- Identify an obstetric emergency response team
- Provide and maintain in labor and delivery/recovery area
 - Adequate staff
 - Adequate equipment and supplies

In view of the above changes in maternal demographics and obstetric practice, it is prudent that all health professionals and obstetric units providing care for such patients be prepared to manage the expected increase in the number and percentage of medical and surgical emergencies in their obstetric population. Some of the steps that need to be taken to ensure patient safety and improve pregnancy outcome are listed in Table 1-3.

These steps should include development of a system to identify and flag all patients who are considered at risk for obstetric emergencies. Once identified, all units should have in place policies and procedures on how to prevent or reduce the risks of these emergencies as well as how to respond to them if they develop. This should consist of a multidisciplinary team that includes nursing staff, anesthesia, senior obstetrician, operating room team, blood bank, and other physicians as needed. These procedures should detail what to do under elective conditions as well as if a patient presents as an emergency.

There are several conditions in obstetrics that are more likely to be associated with emergencies or that may lead to adverse outcome. Thus all units should develop mandatory protocols to address some of these conditions (Table 1-4). This list may be modified according to the specific obstetric unit.

In most obstetric units in the United States, the majority of medical and surgical emergencies are infrequent or rare, unpredictable, and can develop very rapidly. This implies that health care professionals providing care for these patients will have minimal to limited experience in handling these emergencies. Thus it is prudent that all obstetric units develop drills for rehearsal and testing of response and skills of these individuals in the presence of some of these expected emergencies (Table 1-5). This should also include evaluation of the response time as well as effectiveness of the obstetric emergency response team.

Finally, obstetric units providing care for high-risk pregnancies should have a designated area in labor and delivery and/or recovery that is adequately staffed and equipped to handle obstetric emergencies. In addition, they should have well-defined protocols regarding which patients to transfer to other ICUs (medicine or surgery), and how these patients will be promptly transferred as well as who will manage these patients once transferred.

Table 1-4 Mandatory Protocols to Prevent or Reduce Obstetric Emergencies

- Elective inductions and delivery
 - Accurate dating criteria
 - Cervical Bishop score
 - Induction and ripening agents
 - Availability of staff
- Tocolytic agents
 - When to start and when to stop
 - Methods and intensity of monitoring
 - Drugs to use in women with preexisting conditions
 - Cardiac disease
 - Hyperthyroidism, hypertension
 - Pregestational diabetes
 - Placenta previa, abruptio placentae
 - Pulmonary or urinary tract infections
- Magnesium sulfate for preeclampsia or eclampsia
 - When to start and when to stop
 - Monitoring for signs or symptoms of toxicity
 - Management of toxicity
- Antepartum, intrapartum, and postpartum hemorrhage
- Thromboembolism prophylaxis
 - Antepartum, intrapartum, postpartum
 - Method and duration of prophylaxis
- Pregnant patients seen in emergency department area
 - Initial evaluation
 - Method of fetal monitoring
 - When to send to labor and delivery unit
 - Need for immediate delivery
- Pregnant or postpartum patients in intensive care unit
 - Indications for transfer
 - Physician in charge
 - Methods for fetal monitoring
 - Need for immediate delivery
- Goal-directed sepsis protocol

Table 1-5 Fire Drills to Recognize and Respond to Obstetric Emergencies

- Pulmonary embolism
- Pulmonary edema
- Amniotic fluid embolism
- Eclampsia or hypertensive crisis
- Intrapartum or postpartum hemorrhage
 - Shock
 - Disseminated intravascular coagulopathy
 - Blood components and fluid replacement
- Medical-surgical interventions
 - Medications
 - Packing
 - Ligation of vessels
 - Cesarean hysterectomy
 - Bladder or ureteral injury
- Severe sepsis/septic shock
- Diabetic ketoacidosis
- Thyroid storm
- Cardiopulmonary arrest

Suggested Readings

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Continuous electronic fetal heart rate (FHR) monitoring is widely used to monitor all pregnant women with high-risk medical or obstetric conditions, as well as most pregnant women undergoing labor and delivery. The objectives of FHR monitoring during labor are early detection of changes in FHR baseline and patterns in order to identify certain categories that are predictive of fetal hypoxia and acidosis (Table 2-1). Once these changes are identified, the next step is for the medical provider to decide on which ones require careful observation and which FHR require immediate delivery.

Guidelines have been published by the National Institute of Child Health and Human Development (NICHD) working group for definitions, interpretation, and management recommendations for various categories of FHR tracings. The research group defined three categories as either normal (Category I), indeterminate (Category II), and abnormal (Category III). These definitions are listed in Table 2-2 (Category I) and Table 2-3 (Category III). Category II is defined as any pattern not included in Category I or III. An example of Category I FHR patterns is seen in Figure 2-1, of Category II in Figure 2-2, and of Category III in Figure 2-3. The same group also recommended abolishing the term *hyperstimulation* for uterine activity and suggested using the term *uterine tachysystole* (Table 2-4). The definition of baseline variability is described in Table 2-5. Minimal or absent variability can be due to medications that depress the fetal central nervous system, hypoxia, or acidosis (maternal or fetal). The presence or absence of FHR accelerations was not considered important to define the three categories.

The NICHD criteria define normal FHR baseline as a rate of 100 to 160 bpm. Fetal bradycardia is defined as a baseline of <100 bpm for at least 10 minutes, whereas fetal tachycardia is defined as a baseline of >160 bpm for at least 10 minutes. Fetal tachycardia can be related to various etiologies (Table 2-6). Therefore, management should be individualized based on the etiology, the persistence of the pattern, and response to corrective factors.

It is important to emphasize that a category II FHR pattern will be seen in almost all labors, and most of these are reassuring, whereas in others they can be ominous requiring immediate delivery. Therefore, there are potential pitfalls with the new NICHD classification (Table 2-7).