

Perioperative Management of Conjoined Twins

An Essay

Submitted in partial fulfillment for M.Sc. degree in Anesthesia

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2011

المعالجة التخديرية في عمليات فصل التوائم المتلاصقة

رسالة توطئة للحصول على درجة الماجستير في التخدير

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2011

Co____nts

Summary

Conjoined twinning is one of the most fascinating human malformations. Treating conjoined twins can be a daunting challenge for the surgeon as well as anaesthesiologist. Surgical separations occur more frequently and with greater success than before (Kolli S Chalam 2009)

The decision of separation when dealing with conjoined twins is an extremely complicated one. It is a decision to be made solely by the parents. (Kolli S Chalam 2009)

Surgery to separate conjoined twins may range from relatively simple to extremely complex, depending on the point of attachment and the internal parts that are shared. Most cases of separation are extremely risky and life-threatening. (Kolli S Chalam 2009)

Prenatal diagnosis allows careful planning for delivery and for preoperative assessment. (Rode et al, 2006)

Better preconceptual maternal nutrition with folic acid supplementation is likely to reduce the incidence of twinning abnormalities. If the diagnosis is made antenatally, then the decision to terminate the pregnancy may be taken after detailed evaluation and counseling (Alastair 2007)

Delivery at a tertiary centre is recommended for optimal neonatal intensive care and paediatric surgical intervention. (Chandima 2010).

Emergency surgery may be required, but it is preferable to delay surgery to allow growth and the completion of investigations. (Rode et al, 2006)

Detailed preoperative assessment is essential to determine the best surgical approach, reconstruction methods and ultimate outcome. (Rode et al, 2006)

Separation of conjoined twins is a complicated procedure. The importance of a multidisciplinary team with rehearsal of all aspects (surgical, anaesthetic and nursing) of the operative procedure cannot be overemphasized (Chandima 2010).

It is a multidisciplinary team approach involving extensive medical work-up on patients, multiple meetings and discussions with all the involved specialties and supporting staff, involvement of parents, Psychosocial counseling of parents, rehearsal of the planned surgical procedure, media contact prior to Surgery (Kolli S Chalam 2009)

The rationale for deferring surgery should include single heart, major communicating hearts or major anomalies (Kolli S Chalam 2009)

Goals of the anaesthesia care are to pay meticulous attention to detail, monitoring, and vigilance, planning for the postoperative care in the intensive care unit (ICU), by a dedicated team of anaesthesiologists and intensivists for each child with duplication of all monitoring and equipment in one operating room (Kolli S Chalam 2009)

Induction of anaesthesia in such patients requires an experienced anaesthetist. As far as conjoined twins are concerned, the recommended intravenous doses of anaesthetic agents for the combined body weight of the twins are usually halved and then divided into two equal doses, with one being administered to each twin. Reduced incremental doses are titrated against response and help to minimise the dangers of compounding the drug effect (Kiran 2010)

The main problems during the operation are the unusual position of the patients, profuse blood loss, prolonged operation on two patients on the same table and the number of medical personnel involved. (Jaya Lalwani 2011)

Challenges encountered in anesthesia for these twins include identifying anatomical conjunctions, airway management, acquiring vascular access, the potential for enormous blood loss, and maintaining normothermia (Ezike et al., 2010).

Planning for the postsoperative period and the reconstruction and rehabilitation of the babies is essential from the time of their initial admission (Ezike et al., 2010).

Although the outcome is influenced by careful planning and organization from all participants, the prognosis is often predetermined by the underlying anatomy which may preclude successful separation. (Chandima 2010).

Successful management of conjoined twins relies on close communication and cooperation of all members of the multidisciplinary team (Ezike et al., 2010).

List of Abbreviations

ASA	:	American Society Anesthesiologists
CPAP	:	Continuous positive airway pressure
CT	:	Computed tomography
EHBS	:	Extrahepatic biliary system
EKG	:	Electrocardiography
FRC	:	Functional residual capacity
HSA	:	Human serum albumin
ICU	:	Intensive care unit
LMA	:	Laryngeal mask airway
MABL	:	Maximum allowable blood loss
MRA	:	Magnetic resonance angiography
MRI	:	Magnetic resonance imaging
PLMA	:	Proseal laryngeal mask airway

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Acknowledgment

*First and foremost thanks almighty **God**, the most beneficent and merciful from the beginning to the end of this work to be completed in this form.*

*I would like to express my deepest gratitude and appreciation to **Prof. Dr. Sohair Abbas Mohamed Sadek** Professor of anesthesiology and intensive care, Faculty of medicine, Ain Shams University, who supervised this study and provided me, the finest details and rules to write this fruitful essay. Also she taught me how to listen and respect the small point before the big. It's a great honor to have worked under her guidance and supervision.*

*I am deeply grateful to **Prof. Dr. Hoda Omar Mahmoud Ali** professor of anesthesiology and intensive care, Faculty of medicine, Ain Shams University for her constant support, extreme patience, valuable advices and remarks that have been of utmost help.*

*My deep gratitude goes for **Dr. Tarek Mohamed Ashor**, lecturer of anesthesiology & intensive care., Faculty of medicine, Ain Shams University, for his great effort and updated knowledge. He taught me how to gather scientific data from different texts and papers.*

Special words for my Mother for her tenderness, love and care which without her I could not probably finished this essay.



Ahmed Mohamed Eid

Introduction

The term “conjoined twins” denotes twins who are physically joined together. They vary from two symmetrical individuals joined by minor superficial connection, to monsters represented only by portions of the body attached to each other or to a more completely developed host. Rarely one twin is incorporated in the body of the other as an included foetus.

The separation of conjoined twins has always caused considerable interest, not only because of its rare incidence, but also because of the complexity of the operation itself, which presents a great challenge to both surgical and anesthetic teams.

Anesthesia for conjoined twins, either for separation surgery, or for magnetic resonance imaging (MRI) or other evaluation procedures is an enormous challenge to the pediatric anesthesiologist. This is an extra challenging surgery because we the anesthesiologist need to care for two patients at the same time instead of just one.

Anesthesia for conjoined twins’ separation surgery centers on many concerns like:

Conjoined twins' physiology as crossed circulation, distribution of blood volume and organ sharing with their anesthetic implications.

Long marathon surgery with massive fluid shifts and loss of blood and blood components and their rapid replenishment accounts also for a major concern for the anesthesiologist.

Introduction

One of challenges also for anesthesia during conjoined twins operation is meticulous planning for organized management of long hours of anesthetic administration in two pediatric subjects simultaneously with multi surgical specialties involvement and their unique requirements.

Classification and Prenatal Evaluation

Definition of Conjoined Twins:

Conjoined twins are identical twins that have not split properly after fertilization. Identical (or monozygotic) twins are created from a single fertilized egg. This egg usually separates a few days after fertilization, creating two separate embryos. However, if this egg does not separate within 12 days of separation, it will not split completely. Instead of creating two separate embryos, the two embryos will remain attached in certain areas, causing the babies to grow into one another (**Ahmet Baschat., 2011**).

The most famous pair of conjoined twins was **Chang and Eng Bunker** (Thai: อิน-จัน, In-Chan) (1811-1874), (Fig. 1) **Thai** brothers born in Siam, now **Thailand**. They traveled with **P.T. Barnum's** circus for many years and were billed as the **Siamese Twins**. Chang and Eng were joined by a band of flesh, cartilage, and their fused livers at the torso. In modern times, they could have been easily separated. Due to the brothers' fame and the rarity of the condition, the term came to be used as a **synonym** for conjoined twins. (**Ahmet Baschat., 2011**).