CASE REPORT

Our experience of anesthetic management for separation of craniopagus conjoined twins

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ABSTRACT

Summary: We describe the anesthetic/airway management for surgical operations in conjoined twins (Craniopagus) in Children Hospital, PIMS, Islamabad, in January 2011. The anesthetic technique and associated problems are summarized.

Key words: Conjoined twins; Anesthesia; Airway management

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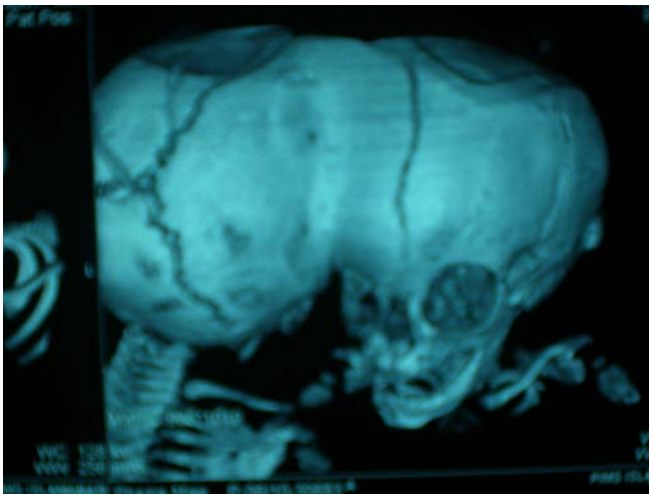
INTRODUCTION

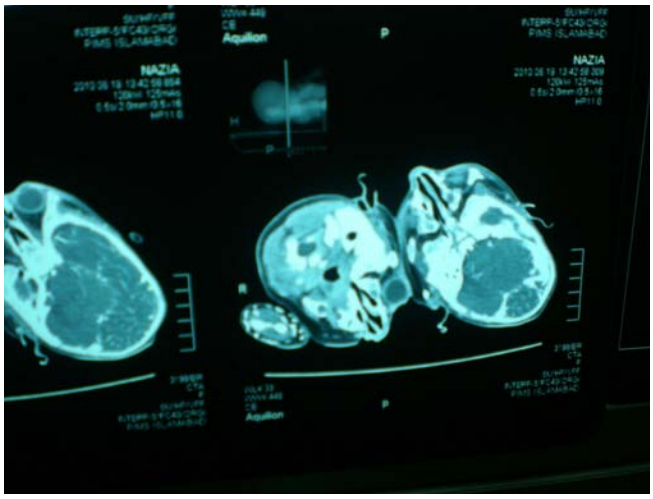
The successful operative separation of conjoined twins requires detailed preoperative assessment, multidisciplinary team planning, intensive anesthetic management and exhaustive postoperative care. Conjoined twins are babies joined together in utero. Incidence of this anomaly has been estimated to be 1:25000 to 1:100000 births; with approximately 60% stillborn and a smaller fraction of pairs born alive have abnormalities incompatible with life. An increased incidence has been noted, ranging from 1:14000 to 1:25000 in some Asian countries, e.g. India, Pakistan and Thailand as well as in Africa, especially East Africa, Nigeria and South Africa.[1-3] The overall survival rate for conjoined twins is 25%. It is frequently found in females with a ratio of 3:1. Conjoined twins are classified by the point of union: thoraco-omphalopagus (32%), thoracopagus (19%), omphalopagus (10%), parasitic twins (7%) and craniopagus (3%).4 Craniopagus babies can be joined at the back of the head, the front of the head or the side of the head. Their skulls are fused but bodies are separate. We describe the anesthetic/airway management for surgical operations in conjoined twins (craniopagus) in our hospital.

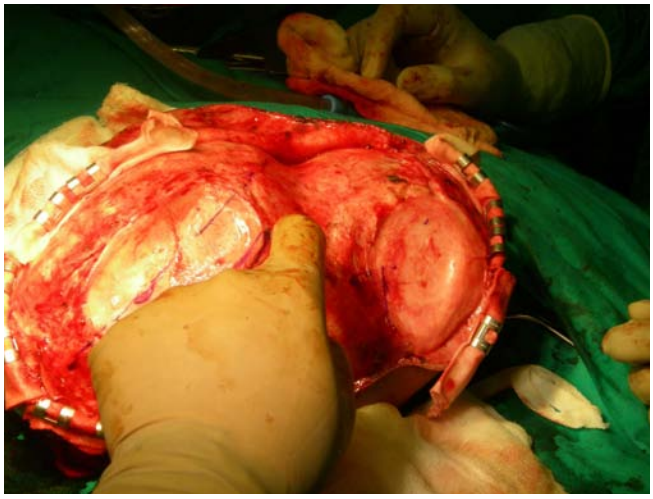
CASE REPORT

Anesthesia or sedation may be required for a variety of surgical or investigative procedures in conjoint twins. Diagnostic investigations that are often required include computer tomography (CT) scan, magnetic resonance imaging (MRI), cardiac catheterization, echocardiography, various endoscopic procedures and many plain radiological studies. In our twins, anesthesia was not required, so anesthesiology team was not involved at any stage of investigations.

Prior to separation, operations for a variety of pathological problems may be necessary. In our experience of this pair of babies, examination under anesthesia for identification







of complex anatomy of airway and the insertion of tissue expanders was performed. Technique of induction and intubation is described as perfor med for separation of babies. We evaluated shunt fraction by intravenous atropine test which did not reflect tachycardia in second baby. Hence, it was concluded that the blood streams did not mix up at any level in this pair. The case was discussed with Prof. Masao from Japan and Dr Joseph Holzki from Germany and their expert opinions sought.

Anesthesia for separation

All the basic principles of pediatric anesthesia applied. From the beginning of the anesthesia, plans ha ve to be made to treat each child as a separate individual with her own anesthetic team and equipment, and not only when the babies are physically separated. The requirements of each baby may differ significantly at any stag e of the operation. We arranged two teams to handle the procedure. Our babies as seen in picture (Picture 1) faced in opposite direction so that when one baby was supine the other baby had to be in prone position. All team members w ere instructed in management of airway during intubation of first baby. After arrival of babies in the operating rooms, individual team members took their responsibilities to care for monitoring devices, central lines, temperature control and airway care.

Technique:

Intravenous lines (peripheral and central) were established and maintained with _ normal saline with dextrose 5%, at the rate of 4ml/kg/hr. Baseline vital signs were documented. After preoxygenation, the supine baby were induced with

ketamine and midazolam followed by succinylcholine. After achieving apnea, intubation was performed without any difficulty. Then inj. atracurium was given for controlled ventilation. In the meantime, prone baby was continuously monitored for sleep, loss of reflexes, loss of breathing, heart rate and oxygen saturation. After bilateral auscultation of the chest, the endotracheal tube (ETT) was fixed. This baby was turned gently and handed over to the second team with all attachments. Now intubated baby was in prone position and the other active baby was supine. Same anesthesia technique was applied to this baby. Babies were catheterized for monitoring of urine output. Before handing over the babies to the surgical team, all gadgets, lines and monitors were rechecked. Head positioning was very important factor and it was managed by special head rings. Babies remained hemodynamically stable till two hours when one baby went into cardiac arrest which was prone and neurosurgeon was operating around the superior sagittal sinus. Inspite of all efforts baby could not be revived and was separated in a dead condition. On second baby, the surgery continued for six hours, after which he was shifted to pediatric intensive care unit without extubation and was put on ventilator. After fifteen days ventilation, the patient expired due to multiorgan failure. During surgery both babies received whole blood about 500 ml and four units of FFP.

DISCUSSION

The first case of surgical separation of conjoined xiphopagus twins was reported in 945AD from Constantinople, where one of the twins died and the other survived for 3 days.[6] The first successful separation of xiphopagus twins was performed by Konig in 1689 .The separation was by tightening and necrosing the band of tissue between the twins. The first successful separation for thoracopagus twins, with at least one twin surviving, was performed in 1900, for pygopagus twins in 1912 and for craniopagus twins in 1952. In 1966, the first separation of ischiopagus tetrapus twins, in which both twins survived, was reported. Anesthetic management for separation of conjoined twins was first published by Hall et al. from Maryland in 19577. During induction of anesthesia, induction agents and muscle relaxants given to one twin may pass to the other, and may result in sedation, airway obstruction, hypoventilation or apnea in the other twin. Anesthesia should be induced after it is known that both twins can be mask-ventilated.8 The greatest hazard to survival is presence of anomalies of the dural venous sinuses and these sinuses develop within the layers of dura, which may be fused.[5]

In our case, the first twin died during the separation procedure, while multiorgan failure and sepsis led to the demise of the second one despite extensive intensive care. Although the fatal outcome had its impact, the wealth of experience, which both surgical as well as anesthesia teams acquired is valueless and we are optimistic that with the lessons learnt our next surgery of a similar nature will be more fruiteful.

CONCLUSION

We conclude that meticulous attention to detail, monitoring and vigilance are essential in this sort of major surgery. Preoperative meetings to collate information, coordinate proceedings, formulate an agenda and develop a plan of action are vital. Close cooperation and communication with all members of the multidisciplinary team is the key to successful management of conjoined twins .

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