ORIGINAL ARTICLE

Experience of 247 Patients Undergoing Surgical Ligation of Patent Ductus Arterioses at Bolan Medical College, Sandeman Teaching Hospital Quetta

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ABSTRACT

Objective: To know the safety of surgical occlution of patent ductus arterioses and its complication when performed in a Bolan Medical College.

Subjects and Method: This retrospective study was carried out in 247 patients of PDA between April 1995 to September 2010 in the Department of Surgery, Bolan Medical College, Quetta. All patient had investigation including colour Doppler confirming the diagnosis of PDA. Any patient having severe pulmonary hypertension, cynosis or clubbing was not included in this study. All patients had one unit of blood crossed-matched.

Results: All patients were underwent surgery, the patients presented at the age range of three years to 35 years with average of 13 years, 185 were females and 62 males, female to male ratio was 3:1. The patients presented with repeated chest infections, shortness of breath, palpitation, chest pain and asymptomatically, 6 patients were associated with small VSD. Size of ductus was large in 5 cases, moderate in 16 patients and in the rest of cases have small PDA. All the cases survived with no mortality, complications included chest infection in 2 cases, hoarseness of voice in one case. No recurrence in four years follows up. Blood transfusion was not required in any case. In all cases we put a chest tube, hospital stay was 2-9 days in range with average of 3 days, and operative ligation of PDA is simple, effective and economical procedure. Early detection by neonatal assessment and early operation should be done.

Key words: Patent ductus arteriosus, Closed heart surgery, Ligation

INTRODUCTION

Patent ductus arteriosus is the congenital anomaly in which the ductus arteriosus remains patent after birth. Normally it closes in the early neonatal life. Incidence of the condition is 0.05% in live birth.[1] Werler et al[2] reported that patent ductus arterioses occurs in 5-10% of all congenital anomalies. Untreated PDA has a mortality of 42% till the age of 45 years. Gross and Hubbard[3] successfully ligated the PDA in a 7½ years old girl in 1938 in Boston in children hospital. This case opened a new era of surgical occlusion for PDA till 1971 when physician started transcather occlusion. Then onward the technique was refined. Initially 35% of the cases had persistent shunt but now-a-days only 5-10% residual shunt are reported.[4] Meanwhile the thorascopic clipping was also developed, with this technique, the damage to recurrent laryngeal nerve has been reported to be more up to 2-3%.[5] Thus in the present era the surgical closure by open method or by thorascopic method as transcather occlusion are in competition to deal the anomaly as perfectly as possible with least complication, least discomfort and cost effectiveness.[6.7] This study was carried out to know the safety of surgical occlusion of patent ductus arterioses, complication rate in the setting of General surgery.

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SUBJECTS AND METHODS

This is a retrospective study looking through records of all patients admitted in Bolan Medical College and deferent private hospital in Quetta from April 1995 to July 2010 with PDA undergoing surgical closure. Preoperative evaluation, all patients underwent preoperative echocardiography, Doppler and color Doppler studies confirming the diagnosis of PDA. Any patient having severe pulmonary artery hypertension with development of cyanosis or clubbing was rejected and referred to cardiac center. The patients having pulmonary artery pressure less than 60 were selected for surgery. All patients had one unit of blood cross matched. Preoperative, chest infection treated, Anemia corrected and cardiac failure treated by lanoxin and diuretics.

Under general anesthesia, with single lumen endotracheal incubation, patients were placed in the left lateral decubitus position. Routine monitoring included transcutaneous oxygen saturation,

continuous end tidal carbon dioxide, blood pressure, and electrocardiogram. Left posteriolateral incision was made through 4h ICS, ribs spread, lung retracted and PDA identified by palpable thrill over it. Longitudinal incision made on parietal pleura over the descending aorta extending up over left subclavian artery origin. The pleura dissected, the ductus cleared and 2l0 silk suture passed around the ductus, one ligated at the pulmonary end and other at the aortic end, pleura closed, drainage tube was left in all patients, while closing chest the anesthesiologist was requested to give positive pressure ventilation to make sure the lungs were fully inflated, after having checked heamostasis, chest was closed layer by layer. Antibiotics and analgesic were used routinely, the drainage tube removed when there was no blood coming out, the patients were discharge and later on two monthly follow up was done. Surgical time is defined as the interval from skin incision to placement of the surgical dressing. Our Surgical time ranged from 40 minutes to 120 minutes [median: 35 minutes (This PDA surgical time compares with a VATS time ranging from 31 to 171 in a similar group of patients undergoing PDA ligation. Operative mortality was zero. Intraoperative complications were developed in patients like severe bradycardia in one case; hemorrhage in one case Postoperative echocardiography examination documented the elimination of the ductal murmur in all patients.

RESULTS

Two forty seven patients were seen, all of these were having average age of 13.0 years and age range was 3 month to 35 years, 185 patients were female and 62 were males. The female to male ratio was 3:1. Associated cardiac anomaly was seen in 5 patients like small VSD in 3 patients and ASD in 2 patients. The size of PDA was small in 26 cases, moderate in16 patients, and large in 5 patients. The pulmonary artery pressure was ranging from 20-60 mmHg (with average of 41 mmHg), five cases required preoperative blood transfusion for anemia correction.

In 18 patients the tube was removed after 2-4 hours and in remaining cases the tube was left for 24 hours. Postoperatively one patient had transient hoarseness of voice for one month and 2 patients developed chest infection which became asymptomatic. The hospital stay was 2-9 days; no any patient was kept in ICU because we have no facility of ICU. All patients had echocardiography prior to discharge or just after discharge which confirmed elimination of ductal flow or shows no residual shunt in all patients. All patients were followed up in OPD and underwent complete echocardiographic and Doppler evaluation at 3 Month, 6 Month, and 1 Year of the procedure; we carefully looked for any residual shunt on each visit. Length of follow-up ranged from 2 days to 323 days. No patient has shown a PDA murmur in follow-up. All incisions healed well without significant scarring or complications.

DISCUSSION

Patent ductus arteriosus is the second most common congenital cardiac disease with incidence of one on 2000 live births in term infants. Its occurrence in adult age is rare PDA is a common congenital heart defect with easy surgical correction.[8,9] The conventional surgery closure is an effective and standard technique. A patent ductus arteriosus was first successfully ligated surgically on August 26, 1938, by Gross and Hubbard.[3] The management of PDA has evolved considerably since this surgical milestone. Various surgical and medical technique used since then have include. In 1946, Blalock[10] describe triple ligation technique and Heymann et al[11] in 1976 introduced Indomethacine as pharmalogical method of duct closure in premature babies, umbrella device closure, ligation and division and open surgical ligation through a thoracotomy or even sternotomy, hem clip application, recently introduced therapies include percutanous transcatheter ductus closure (PTDC) device and Video-assisted thoracotomy (VAT).[12,13] Although at the present time percutaneous closure is the technique of choice for its treatment, surgery is still indicated for low-weight preterm babies, when an associated cardiac lesion is present, or when percutaneous technique fails.[14] Transcatheter closure has recognized limitations, patient weight (lower than 4 kg) or ductal anatomy, and embolism, hemolysis or infection risks for the procedure. Further, 10 to 20% of residual shunt was described in other series. Video-assisted thoracotomy for PDA ligation has potential for uncontrolled hemorrhage, recurrent laryngeal nerve injury.[15,16]

As our group of patients was small in size and lack of facilities, operative treatment was thought as the best option, our results well tally with other centers of excellence. Whatever the method adopted mortality is zero, as for complications the, recurrent laryngeal nerve injury occurs with surgical methods, our one case developed this injury which was transient in nature, the incidence is more in neonate and infants when clipping is employed for PDA occlusion and with video-assisted thoracotomy 8.8% by Burke et al.[17] It has been reported in 2% of cases of Laborde et al.[18] This complication does not occur with coil occluder or umbrella. Regarding the patients comport, coil group is much superior requiring no analgesia, no antibiotic and very little restriction of activity after procedure.[19,20]

We had no patient with persistent shunt after the surgical procedure. Same has been reported by Frabes and Evans.[21] Persistent shunt occurs only in cases of percutaneios transcatheter ductus closure. Visu et al[22] has reported it to be 9% among 40 patients treated by coil occlusion and none of 40

patients treated by surgery. Uzum et al[23] has reported 27 cases with persistent shunt after coil occlusion documented 10 minutes after procedure, 15 resolved after 24 hours and 5 others in 3 months. The hospital stay was 2-9 days. It was 3-8 days by Frabes and Evans[21] while Laborde et al[24] reported it to be 3 days but it was defiantly least with transcatheter ductus closure. Laborde et al[24] has also reported it to be 48-72 hours.

CONCLUSION

1. Open thoracotomy for Patent ductus arterioses ligation can be performed safely, reliable, effective and economical and without recurrence, so it can be performed in the setting of general surgical theatre.
2. With this procedure, there is a significant reduction in mortality, hospital stay and risk associated with blood transfusion.
3. All other therapeutic intervention must be compared to this standard procedure.

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