IN CHILDREN: LESSONS FROM A SINGLE CENTRE EXPERIENCE

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confirmed ganglioneuroma. The male infant who was evaluated for hypertension was operated with a suspicion of phaeochromocytoma, but the final histopathology was suggestive of a localised neuroblastoma.

The follow-up duration ranges from 24 to 87 months (mean — 54.4 months). The child with stage I neuroblastoma is on follow-up and continues to be symptom-free at 24 months. The children who had bilateral adrenalectomy are on replacement therapy with hydrocortisone and fludrocortisone. All the children have had a resolution of the clinical and biochemical markers of adrenal gland hyperfunction. None of the children have shown clinical or radiological signs of local recurrence or distant metastases during the follow-up.

DISCUSSION

The adrenal gland is considered suitable for laparoscopic resection because of its small size and retroperitoneal location.[7] It has established advantages over the open procedure in adults; these advantages are now being extrapolated to the pediatric age group also. Indications for adrenal surgery differ in adults and children. Literature reveals neuroblastic tumours to be the most common adrenal lesions, requiring excision in the pediatric age group;[6,8] there was one neuroblastoma and one ganglioneuroma in our single centre experience. The safety and feasibility of LA for all stages of neuroblastomas in pediatric patients (including infants) has been previously documented.[6–9] In fact, LA has even been suggested as an option for residual tumours that have a favourable cytoreductive response to chemotherapy.[10,11]

Unlike in adults, suspected phaeochromocytomas in children and adolescents need to be thoroughly evaluated to rule out bilateral lesions, extra-adrenal lesions as well as syndromic associations like multiple endocrine neoplasia, von Recklinghausen disease, tuberous sclerosis, Sturge-Weber syndrome and von Hippel Lindau syndrome.[6,7] As in adults, children also require preoperative preparation, with appropriate alpha adrenergic blockers. Operative precautions like early control of adrenal veins and minimal handling of the gland are followed, as for adults. The intraoperative haemodynamic fluctuations that may occur in patients with phaeochromocytomas are thought to be less common in laparoscopy than in open surgery and can usually be controlled with temporary cessation of the procedure and appropriate medical measures.[12]

Two children with Cushing's disease and one with phaeochromocytomas underwent bilateral LA under the same anaesthesia. The boy with bilateral phaeochromocytomas, as part of the von Hippel Lindau Syndrome, had a small left adrenal mass that was first excised; the larger right adrenal mass had significant retrocaval extension that necessitated insertion of the surgeon's non-dominant hand for the final stages of dissection. No special hand-assist ports were used and excision was completed with laparoscopic instrumentation. As the same incision was then used for retrieval of the specimen, the cosmesis was also not altered. The terminal hand assist is a modification we had previously used successfully in adults to complete difficult laparoscopic procedures, without an open conversion.[13] It facilitated overcoming difficult mobilisation in the later stages of surgery, while avoiding a hand port early on in the dissection. In this child, it was useful in excising the relatively large mass from the comparatively smaller intraperitoneal space.

Bilateral LA in children is not frequently reported and can be performed under one anaesthesia[11,14] or as a staged procedure.[6] Ideally partial adrenal gland preservation should be attempted in children undergoing bilateral adrenalectomy;[15] this was accomplished in the boy with the von Hippel Lindau syndrome, where a portion of normal appearing tissue from the right adrenal gland was left behind after excising the large tumour. The use of intraoperative ultrasound through laparoscopic ports has been prescribed to accurately delineate the adenoma and preserve the normal cortex,[16] but this is presently not available at our centre. In the children with refractory Cushing's disease, the need for complete ablation precluded conservative surgery.

Although other series has successfully used the retroperitonescopic approach for pediatric LA,[17–19] we routinely prefer the transperitoneal approach in pediatric laparoscopy. Of late we have started employing the retroperitoneoscopic approach for adrenalectomy in selected adults and as our experience improves, we hope to attempt this in children as well.

CONCLUSION

LA can be considered to be equally safe and effective in pediatric patients as in adults and is applicable for most pathologies. However, patient selection for laparoscopy is crucial and is dependant on the child's body habitus, as well as the experience of the surgical and anaesthetic teams. A low threshold for open conversion in the early phase of the learning curve is recommended. Terminal hand assist may be beneficial in difficult cases.

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