

Minimally invasive surgery in adolescents

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In the female adult population laparoscopy has been now accepted as the gold standard in the diagnosis and management of benign adnexal masses and chronic pelvic pain. The advances in techniques of performing laparoscopic surgery in adults have led to minimally invasive surgery being carried out in children and adolescents. This novel method of performing surgery has several advantages viz. being less invasive associated with less morbidity and physical and mental trauma, resulting in a faster recovery has a faster return to normality as compared to open surgery.

The period of adolescence is one which is a difficult time for young people. Major changes in the body are accompanied by mental and psychological alterations as well adding to the stress that the adolescent is subjected to.

The paediatric surgeons have been slow to accept laparoscopy for diagnosis and surgical treatment but rapid advances in technology are sooner or later going to make this modality a mandatory one in Paediatrics.

The indications for which laparoscopic surgery can be carried out in adolescents are as follows:

- a) General Surgical indications: Appendicectomy, Cholecystectomy, Abscess drainage, Herniorrhaphy, Adhesiolysis, Bowel resection
- b) Gynaecological indications: Ovarian Cyst management, Gonadal Biopsy, Ovarian Detorsion, Ectopic pregnancy management, Adhesiolysis, Intersex exploration, Pelvic inflammatory disease management.

Dermoid cysts are managed laparoscopically by cystectomy, and a microcautery tip may be utilised to make the initial incision with a 5 to 10 Watt current.

Ovarian masses are commonly Germ cells tumors in

young adults (less than 21 years) and if a malignancy is suspected a laparotomy is preferable.

At times an oophorectomy may be required at the time of which it is essential to avoid injury to the ureters as the distance between the immature ovaries and the ureter is very small. In general it is always prudent to attempt ovarian conservation and all attempts should be made in that direction.

Gonadal biopsies are indicated in intersex situations. In patients with Testicular feminisation syndrome a prophylactic oophorectomy at 16 to 18 years of age (after puberty is established) is indicated in order to prevent the occurrence of a malignancy (which is rare before the age of 25 years) Sebastino and Nicola (1998) report that individuals with androgen insensitivity syndrome have a high risk of 20% to 30% of developing malignancy in their gonads. Laproscopic gonadectomy was performed in two such patients. A 17 year old woman with Swyer syndrome and a 13 year old with Morris syndrome.

Ovarian torsion may occur in young girls especially if a small ovarian cyst is present. Laxity of the ligaments in this population makes torsion more likely. The importance of ovarian conservation makes this entity an emergency. The ovary is untwisted and adequate perfusion allows conservative treatment. The accompanying ovarian cyst is dealt with by carrying out a cystectomy.

The procedure should be carried out in fully equipped theatre setup with asepsis similar as that for Laparotomy. The bladder should be catheterised before starting the procedure as difference exist in the surface area occupied by the bladder in younger girls and in disposition of the bladder. The pneumoperitoneum should be carried out with a small Verres needle using Carbon dioxide. Palmer's point may be preferred as the point of entry in a young girl.

The laparoscope used is a 6 mm Storz or Wolf telescope

passed through a small incision made just below the navel. Smaller endoscopes 2 mm, 3mm, and 5mm in diameter are now available and a microendoscopy may be carried out with reduced morbidity.

A thin girl will have the abdominal aorta located just below the navel and it may be injured the time of trocar entry. Elevation of the abdominal wall will go a long way in preventing this dreaded complication. Manipulation of the uterus with a manipulator should be avoided because of the small size of the genital organs. A blunt needle passed through a puncture in the left lower quadrant is used to manipulate the abdominal and pelvic organs for adequate visualisation. Care should be taken to avoid injury to the inferior epigastric vessels which may be closer to the midline.

Minor procedures such as gonadal biopsy, aspiration of Pouch of Douglas contents and aspiration of ovarian cysts can be carried out with a single portal in the lower quadrants. For more extensive surgery such as appendectomy or ovarian cystectomy an additional port is mandatory.

Of the above indications several are common to indications in the adult population. However the intersex evaluation and treatment and to an extent gonadal biopsy are certainly unique to this group.

Laparoscopic Surgery in children presents subtle challenges as the anatomy of the abdomen and pathophysiology is marginally different from that in adults. The gynaecologic surgeon should be well versed in these differences before embarking on the operation. Braeco (1997) Dept of Obstetrics and Gynaecology University of Florence, Italy, performed operative laparoscopy for ovarian cysts in 12 girls aged between 8 and 19 years with USG characteristics not suggestive of malignancy and CA125 levels below 35 U/ml. The surgical intervention was always conservative and he encountered no complications. Patients recovered quickly and returned to school in a week. He concluded that operative laparoscopy is appropriate in girl and teenagers though proper preoperative evaluation is necessary to select patients likely to have a benign mass.

Dulemba (1997) The Womens centre Denton, Texas USA carried out a Laparoscopic appendectomy for chronic appendicitis in an 8 years old girl using 3 endoloops and an intra abdominal pressure of 8 to 10 mm Hg. He stressed that the smaller anatomy in this population should be kept in mind and chronic appendicitis should be considered in all age groups.

Adnexal torsion can be tackled with the laparoscopic approach. Between 1992 and 1996 Pansky et al (1997), Tel Aviv University, Israel treated 7 girls with abdominal pain resulting from ovarian torsion. If the torsion is not associated with gangrenous changes a laparoscopic detorsion with aspiration of a functional cysts if present, is possible.

Endometriosis is seen to occur at even the immediate postmenarchal age. Emmert and Riedel (1997) carried out laparoscopy in 105 adolescents for endometriosis. Most of these young girls between the ages of 11 and 19 years suffered from acute or chronic abdominal pain.

Traditional gynaecologic opinion holds that endometriosis is rare in teenagers. During the adolescent years, infertility is not usually a problem, but painful dysfunction, especially menstruation, certainly may be a disabling one. Teenagers account for 8.5% of the series of endometriosis patients reported in an earlier study.

Chatman and word (1982) report that 43 consecutive diagnostic laparoscopies were performed in symptomatic black adolescents who complained of disabling pelvic pain and/or abnormal vaginal bleeding. The great majority of patients were selected for laparoscopy because of the severity of their symptoms coupled with physical findings suggestive of significant pelvic pathology. The largest number of patients (25) were late teenagers, aged 18 and 19. Only six patients were in their early teens years. Twenty-eight (65%) teenagers demonstrated endometriosis. Five (11.6%) had no demonstrable pelvic pathology. Ten (23%) had pelvic inflammatory disease at the acute subacute or chronic stage. One patient (2%) had pelvic adhesions of undermined etiology. One patient had acute pelvic inflammatory disease in combination with endometriosis.

The posterior cul-de-sac was involved in 21 cases (75%). The uterosacral and broad ligaments were involved in 25% of the cases when each ligament was considered separately. Bowel was involved in 2 cases (7%). Using the classification system of Acosta et al (1973) it became clear that most cases were mild (14, or 50%) or moderate (11, or 39%). Only 3 patients were classified as having severe disease.

Endometriosis is far more common than is generally recognized. The disease also seems to occur much earlier than it is generally thought, and it seems to have no racial or ethnic barriers. The disease is common in teenagers who have severe pelvic pain of a cyclic or acyclic nature. Unlike Schiffrin et al (1973), they did not find any significant, associated genital anomalies in any of their patients. Others have found lower but significant number of adolescents with out-flow tract obstruction associated with endometriosis, suggesting tubal reflux as an etiology in this group. Because the average interval between menarche and diagnosis was only 4.5 years in our patients and because of the lack of obstructive phenomena evident on evaluation, it is difficult to accept retrograde menstruation as an etiologic factor in these cases. The embryonic-cell-rest theory seems more consistent with this patient group. Medical therapy was preferred to laparoscopy with cautery: The authors felt that with endometriosis, cautery has limited application in terms of safety and anatomy, may lead to both immediate intraoperative complications and postoperative pelvic adhesions, in the long run and is necessarily definitive and permanent. It is a maxim of medicine that the earlier a problem is recognized, the easier and more effective the treatment.

Endometriosis can be a progressive disease and seems to occur in the adolescent with previously unrecognized frequency. After proper preoperative evaluation, the liberal use of laparoscopy in carefully selected adolescents can document the presence of this potentially progressive and crippling disease. Early diagnosis and treatment of endometriosis represent preventive medicine at its best in gynaecology.

Goldstein et al (1980) reported that between July 1974

and September 1979, 140 adolescent women, ranging in the age from 10.5 to 19 years, were admitted to the gynaecology service of the Children's Hospital Medical Center, Boston for the evaluation of chronic pelvic pain. Laparoscopy was performed one or two days after admission under general endotracheal anesthesia.

The most common condition encountered, involving almost half the patients, was pelvic endometriosis. Seventy four patients, ranging in the age from 10.5 to 19 years, were found to have disease that was obvious to laparoscopy. A biopsy of one of the most characteristic lesions was obtained for histologic confirmation and the extent of the apparent disease was carefully recorded. When only a few implants were present in the pelvis (Kistner stage I), fulguration was performed and sometimes followed by anterior fixation of the uterus by round ligament suspension. When the disease appeared to be more extensive but without obvious endometrioma formation, fulguration and biopsy were followed by postoperative ovarian suppression. Lysis of adhesions was possible at laparoscopy in some instances without recourse to more extensive surgery. 18 patients (13%) were found to have postoperative adhesions extensive enough to appear responsible for pelvic pain.

In 9 of the 18 patients, adequate lysis of adhesions, using the operative scissors, was possible at laparoscopy alone, whereas in 7 cases, laparoscopic lysis was deemed inadequate and laparotomy was performed.

Uterine anomalies were encountered in 12 of the 140 patients. All of these patients had obstructed menstrual outflow, the etiology of which had not been diagnosed preoperatively, although in three cases the diagnosis was suspected because of the presence of tender mass lateral to the uterus associated with cyclic menstrual pain. Six patients who exhibited diffuse pelvic tenderness on preoperative examination were found to have evidence of old or fresh intraperitoneal bleeding at laparoscopy. In two of the three cases no bleeding point was demonstrable, and one patient was found to be bleeding diffusely from her corpus luteum. When possible, intraoperative treatment consisted of fulguration of the bleeding point followed pelvic irrigation with saline.

Ovarian cysts were encountered in five patients. The cysts were all physiologic rather than neoplastic and ranged in size from 3 to 6 cm. The pain appeared to be due to intermittent adnexal torsion without strangulation. At laparoscopy, puncture aspiration of the cyst was carried out in all instances. Inflammation of the uterine serosa was observed in four patients. In each case aerobic and anaerobic cultures were negative, and no other abnormalities were found. The cause of the apparent inflammation was unclear. In the remaining 19 patients, no apparent causes of the chronic pelvic pain was detected.

Laparoscopy offers a sensible and simple approach to the diagnosis of chronic pelvic pain in adolescent females. A number of conditions encountered were found to be amenable to laparoscopic surgical treatment, thus obviating the need of laparotomy with its associated increase in morbidity. Endometriosis was the most common condition encountered in this group of adolescents despite the fact that no patient has been menstruating for no longer than seven years. Treatment of endometriosis does not differ from that employed in the older women. Postoperative adhesions constituted the second most frequent cause of pelvic pain in their series. The gratifying response to laparoscopic lysis is not surprising in light of their experience with similar treatment in adults.

The utilization of laparoscopy for diagnosis and therapeutic applications in young girls has a great potential. As more and more Gynaecologists and Paediatric surgeons take to this minimally invasive form of surgery more literature will be available. Safety factors have to be kept in mind before embarking on this novel approach to a problem.

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