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Paediatric laparoscopic orchidopexy as a novel mentorship: Training model

Vipul Gupta, Sunil Kumar Yadav, Elterman Dean, Pradip Vincent, Farhat Walid[1], Abdulnaser Al Said

ABSTRACT

Background: Although Laparoscopy is becoming a standard procedure in management of pediatric urology disorders, but its widespread use still limited. This can be attributed mainly to difficulty in acquiring such specialized technique, especially by post graduate practicing urologist. Thus, we herein evaluate the impact of condensed laparoscopic training programme in children hospital with the aim to analyze the feasibility and safety of laparoscopic orchidopexy in training basic laparoscopic skills. The aim of this study was to review experience as a mentor in training laparoscopic skills through condensed training programme based on high volume low risk procedure of pediatric laparoscopic orchidopexy. **Materials and Methods:** In order to implement a condensed laparoscopic curriculum in a short period of time while maintaining utmost patient safety, laparoscopic orchidopexy was used as the technique of choice. The course was conducted over a period of 5 days starting from 1st November 2010 in a tertiary pediatric surgical center under guidance of an expert mentor. A total of 30 testicular units in 27 pediatric patients of different age group diagnosed with impalpable undescended testis underwent laparoscopic intervention. The course was conducted in three stages with the aim to deliver laparoscopic skills to trainee. In stage one out of eight cases operated by mentor with assistance of trainee six were operated on day 1 and two cases were operated on second day. The trainee performed 12 cases of laparoscopy independently with assistance of mentor in stage two which was carried out on day 2, 3 and 4. Finally all 7 cases including two second stage laparoscopic orchidopexy procedures were carried out independently by trainee under observer ship of mentor in stage three during day 4 and 5 of training programme. The feasibility and efficacy of laparoscopic orchidopexy in training laparoscopic skills through condensed training programme was assessed through analysis of mentorship experience.

Key words: Laparoscopic orchidopexy, pediatric, training mentorship

Department of Pediatric Surgery and Urology, IBN Sina Hospital, State of Kuwait, [1]Hospital for Sickkids, Toronto, Canada

Address for correspondence:
Dr. Gupta Vipul,
Department of Pediatric Surgery and Urology,
IBN Sina Hospital, Kuwait.
E-mail: drvipul75@yahoo.co.in

INTRODUCTION

In recent years an increasing number of pediatric surgical cases are being managed successfully by laparoscopic technique. Although pediatric urologist have found themselves well versed with minimal invasive and endoscopic procedures, but most of the trained postgraduate practicing pediatric urologists find themselves lagging behind in laparoscopic skills.[1-3] Moreover, the advantage of performing different urology procedures like nephrectomy, pyeloplasty, orchidopexy, etc. are successfully by laparoscopy in pediatric age group mandates formal laparoscopic training of practicing urologist.[2] Since, laparoscopic surgery requires different set of surgical skills and way of viewing anatomy, so a need for planned training programme is warranted to help urologist gain considerable hands on training and experience in basic pediatric laparoscopic skills.[2] A review of literature suggests that most training programme have been formulated based on laparoscopic nephrectomy which remains a complex procedure associated with complications along with high take over rate by mentor.[1-3] Moreover, low volume of cases requiring nephrectomy remains another factor affecting the successful training of urologist especially over a short period of time. So we planned a condensed training programme based on high volume low risk procedure, like laparoscopic orchidopexy with the aim that more number of cases can be performed over a short period of time. We highlight the mentorship experience from this training programme with the aim to highlight its advantages and long term feasibility in training urologist the basic laparoscopic skills.

MATERIALS AND METHODS

The present training programme was conducted with the aim to provide condensed hands on training in laparoscopic surgery over limited time period taking into consideration patient safety. Thus, laparoscopic orchidopexy was considered as technique of choice in 27 pediatric patients of different age group requiring laparoscopy for impalpable undescended testis. The training programme was conducted over a period of 5 days starting from November 1st, 2009 under the guidance of expert mentor (W.F). The postgraduate practicing pediatric urologist in children hospital without prior laparoscopy exposure underwent primary hands on training as a trainee although other surgeons attended the course. After evaluation in outpatient clinic, both clinically and with ultrasound scan the cases were randomly divided regardless of the age group and 30 testicular units underwent laparoscopic intervention with Karl Storz laparoscope using 5mm and 3mm ports and 30° telescope. Prescrotal approach was practiced in cases requiring exploration on finding vas and vessels entering inguinal canal.

The mentor conducted the course in three stages. In stage 1 trainee was made familiar with the laparoscopic instruments through a short lecture given by mentor at the beginning of course. Subsequently, trainee was taught the basics of laparoscopy including initial steps of accessing peritoneal cavity, handling of camera and instruments along with different anatomical views during the first eight cases operated by mentor with assistance of trainee on day 1 and 2. With the aim, to utilize time and facilitate handling of different instruments trainee was encouraged to have hands on practice with unsterile instruments in between the cases. The stage two was conducted with the aim to make trainee undertake laparoscopic procedure independently. The mentor assisted the trainee in 12 cases during day 2, 3 and 4 of the course. The trainee was made familiar with different anatomical views, surgical maneuvers and the skills of dissection along with proper instrument handling. Once trainee was found to be more confident stage three was undertaken on day 4 and 5 of the course. In this stage, mentor observed trainee performing 7 cases independently with the aim to assess the difficulties encountered in undertaking procedure independently, so that timely guidance trainee can be made capable of undertaking the procedure independently after the course. At the end of training programme the laparoscopic approach and the operative lessons learned was reviewed by mentor through a short audio-visual presentation and the experience of trainee with such condensed training programme was shared with attending surgeons.

RESULTS

The results of training programme were analyzed in terms of short term surgical outcome and experience of mentor with laparoscopic orchidopexy procedure in providing hand assisted laparoscopic training. Among 27 pediatric cases of undescended testis 30 testicular units were operated successfully by laparoscopic intervention without any complication and none of the case required conversion to open procedure. On day 1 mentor performed different laparoscopic procedures for undescended testis on six testicular units with assistance of trainee. The trainee was given a short lecture pertaining to initial laparoscopic set up and instrumentation both at the start of programme and in between the cases. Among six cases stage 1 Fowler-Stephens orchidopexy was performed in two patients, with an average operating time of 30 minutes during which the trainee was taught initial laparoscopic skills pertaining to port insertion, camera and instrument handling along with familiarity with different anatomical views and laparoscopic maneuvers. One case, underwent single stage Fowler-Stephens orchidopexy with an operative time of 40 min. Two patients had diagnostic laparoscopy with average operating time of 15 min and subsequently underwent orchidectomy for atrophic testis through prescrotal approach. The mentor performed one second stage procedure on day 1 with average operative time of 45 min. During day 1 it was observed that with theoretical lectures and hand assisted training trainee could initiate laparoscopic procedure including port insertion and handling of camera just after assisting first three cases. The stage 1 of teaching was continued on day 2 with mentor operating one case of stage 1 Fowler-Stephens orchidopexy and another one for single stage laparoscopic assisted orchidopexy with previous abdominal exploration for Necrotising enterocolitis. It was observed that although laparoscopy was difficult in later case owing to dense adhesions but inguinal exploration under laparoscopic guidance facilitated mobilization of intra-abdominal testis without any bowel injury. This appeared to be an added advantage of laparoscopy in such cases where a chance of bowel perforation at the time of sac mobilization appears high owing to presence of adhesions.

Subsequently, trainee was encouraged to undertake laparoscopic procedure in 12 cases with assistance of mentor in stage 2 of training carried out on day

2, 3 and 4 operating a total of 14 testicular units. It was observed that trainee could successfully perform unilateral stage 1 Fowler-Stephens procedure in three cases with operating time of 40 min and two patients underwent bilateral stage 1 Fowler-Stephens procedure with average operative time of 50 min. None of the cases had any complication expect one where mentor had to take over due presence of ooze owing to improper placement of clip. Subsequently trainee found ligasure vessel sealing system more convenient for stage 1 Fowler-Stephens procedure. The diagnostic laparoscopy was performed in seven cases with an average operative time of 25 min and all the atrophic testicular units were removed through prescrotal approach.

At the end of the programme trainee performed seven cases independently under observation of mentor. Among these cases two patients underwent second stage Fowler-Stephens orchidopexy one each on day 4 and 5 with an operative time of 150 min. It was observed that trainee could operate rest of the five cases independently, without any help of mentor which included stage 1 Fowler-Stephens procedure in two and diagnostic laparoscopy followed by prescrotal exploration in other three patients.

The surgical outcome was assessed in terms of intra-operative complications and short term surgical outcome on follow up of 8-10 weeks in outpatient clinic. It was observed that all laparoscopic procedures could be performed successfully without any major complication requiring conversion to open surgery. All except one case with improperly placed clip during stage 1 Fowler-Stephens procedure none of the cases operated by trainee in stage 2 and 3 of programme ended with takeover by mentor. Moreover the take rate by trainee in acquiring laparoscopic skills in this programme was observed to be high as indicated by successful completion of laparoscopic procedure by trainee. The mentor also felt comfortable in providing hand assisted laparoscopic training in more number of cases were available in a short period of time owing to simplicity of procedure.

DISCUSSION

The application of laparoscopy in pediatric urology has grown exponentially over the last few years.[2,3] This can be attributed to advancement in laparoscopic instrumentation and advantage of minimal invasive technique with short convalescence in performing different pediatric urology disorders successfully with minimal morbidity.[2] Although, laparoscopy training is becoming a part of curriculum of pediatric urology fellowship programmes, but still most of the postgraduate practicing pediatric urologist find themselves unfamiliar with laparoscopic skills thus restricting the widespread use of laparoscopic interventions in pediatric age group.[1,2,4] Although endoscopic procedures are routinely performed by urologist but most of the practicing surgeons find it difficult to acquire these specialized laparoscopic skills.[2] This can be attributed to different anatomical view, instrumentation, tactile feedback and depth of perception.[1,2] So for successful training in laparoscopy, a programme aimed at providing considerable hands on experience appears mandatory with the aim to optimize the treatment of large volume of cases managed by practicing urologists at community level.

A review of literature suggests that the role of mentor remains the key denominator for success of laparoscopic training programme owing to feasibility of providing hand assisted laparoscopy training (HALT) which has been found to be associated with high take rate.[1,2,4,5-7] This has been attributed to successful transition between conventional open surgery and pure laparoscopy by allowing tactile feedback, hands on practice along with understanding of different anatomical views and technical steps thus, reducing the time of learning curve.[1,2,7-9] The importance of mentorship is further highlighted from the fact that laparoscopy has been found to be implemented more effectively, if clinical mentoring is provided to community urologist.[2,10] A review of literature suggest that most of the mentors have been providing laparoscopic training with complex procedures like laparoscopic nephrectomy and often find it difficult to succeed owing to associated devastating complications and low volume of cases available both during and after training programme.[1,4,8] So, to implement laparoscopy in day to day practice of pediatric urologist a need of training model based on high volume low risk procedure needs to be formulated.[1,8] So, we herein assess the feasibility of laparoscopic orchidopexy for mentors in making unexposed urologist familiar with basic laparoscopic skills. To the best of our knowledge the mentorship experience with laparoscopic orchidopexy has rarely been discussed in literature till date. Thus, we share mentorship experience of our training programme with the aim to highlight the feasibility along with its short term surgical success especially in training postgraduate practicing urologist.

Although the role of mentor remains most important determinant for effectiveness of training programme

but still the overall success is influenced by four basic steps including observation, theoretical learning, assisting and operating.[2,7-9] It has been well recognized that perfect comprehension of each step is mandatory before proceeding to next step.[1,2,5,8] This remains important especially for beginners who often find it difficult to have confidence with two dimensional anatomical view, depth of perception, and tactile feedback.[1,2,8] With the aim, to overcome these obstacles we planned a training programme under guidance of expert mentor. The present training programme was conducted in three stages aimed at making trainee competent in initiating laparoscopic setup including initial steps like port insertion through practical as well as theoretical knowledge of procedure along with handling of instruments in stage 1 and subsequently as trainee was more familiar with anatomical view and surgical maneuvers he was encouraged to undertake the procedure independently with assistance of mentor in stage 2 and under observer-ship in stage 3. Thus, the short term surgical success of the present programme can be attributed to nature of laparoscopic orchidopexy procedure which facilitates trainee to learn basic lap skills through the basic principles of observation, assisting and operating over a short period of time.

A few trends in data pertaining to our mentorship experience are of worth consideration. It was observed that such condensed training programme based on laparoscopic orchidopexy which being associated with transperitoneal, easily accessible approach facilitates mentors in making trainee well versed with different views of anatomy along with simultaneous discussion thus clearing the doubts related to anatomical details which is often not feasible on review of video tapes. Moreover, mentored approach of updating the theoretical knowledge of trainee pertaining to laparoscopic skills through on table lectures both during and in between the cases appeared effective in making trainee capable of taking over the initial steps of laparoscopy procedure including the setup and the port insertion confidently only after assisting first few cases. The utilization of time available between the cases provided trainee with an opportunity for having hands on practice with different unsterile instruments thus, facilitating acquisition was found to be helpful in facilitating instrument handling by trainee. Being mentor we feel that this approach remains an added advantage of the present programme in regards to proper utilization of time which helps in making trainee more comfortable with laparoscopic skills over limited time period.

The mentorship experience with laparoscopic orchidopexy as a high volume low risk procedure in teaching laparoscopic skills needs to be emphasized. During this training programme it was observed that high volume of such cases are usually available easily at community level owing to high incidence of undescended testis as compared to other renal pathologies requiring complex laparoscopic interventions. This provides an opportunity for trainee to have hands on practice on more number of cases over short time period. Moreover the ease of undertaking this procedure owing to its simplified nature, easy intra-peritoneal accessibility and low complication rate facilitates both teaching and acquisition of laparoscopic skills by mentor and trainee respectively. Thus, the present mentorship experience suggest that as compared to complex procedures like pyeloplasty, nephrectomy etc. laparoscopic orchidopexy facilitates easy organization of condensed training programme apart from having advantage of short learning curve and high take rate mainly owing to high volume low risk nature of procedure.[1,2]

A review of literature suggests that the volume of cases available for subsequent hands on practice remains a crucial factor affecting capability of trainee in acquiring specialized laparoscopic skills.[1,2] The present training programme appears to have this advantage as easy availability of high volume of cases of laparoscopic orchidopexy even at community level makes hands on practice to be continued independently after the mentored programme. Although long term results with this training programme are awaited but this factor appears to be important in making trainee efficient in acquiring laparoscopic skills.

The advantage of laparocopic orchidopexy especially for travelling mentors needs to be highlighted. The mentorship experience with present training programme suggests that laparoscopic orchidopexy can be performed successfully with basic laparoscopic instruments. This appears to be an advantage of laparoscopic orchidopexy over complex training procedures like laparoscopic nephrectomy which usually require advanced laparoscopic set up owing to complexity of procedure. So laparoscopic orchidopexy may appear to an ideal procedure for traveling mentors in teaching basic laparoscopic skills to community urologist where specialized instrumentations and infrastructure for complex laparoscopic procedures is usually not available.

Thus, mentorship experience with present programme suggests that laparoscopic orchidopexy appears to

be a safe and effective procedure for introduction of laparoscopic skills at community level through condensed hand assisted training programme. This can be attributed mainly to high volume low risk nature of procedure simplicity of procedure which provides an opportunity for trainees to have continuing hands on practice thus, optimizing the effectiveness of mentorship in such condensed laparoscopic training programme.

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