

Sexuality after laparoscopic Davydov in patients affected by congenital complete vaginal agenesis associated with uterine agenesis or hypoplasia

A.Giannessi¹, P.Marchiole³, M.Benchaib², M.Chevret-Measson¹, P.Mathevet^{1,4} and D.Dargent¹

¹Department of Obstetrics and Gynecology, ²Department of Reproductive Medicine, Hopital E.Herriot, 69437 Lyon, cedex 03, France and ³Department of Obstetrics and Gynecology, Ospedale San Martino, 16132 Genova, Italy

⁴To whom correspondence should be addressed at: Department of Obstetrics and Gynecology, Pavillon L, Hopital E.Herriot, 69437 Lyon, cedex 03, France. E-mail: patrice.mathevet@chu-lyon.fr

BACKGROUND: Several surgical techniques have been described for the treatment of patients with vaginal agenesis. The simplest intervention that gives good sexual results should be the surgical technique of choice. **METHODS:** We report anatomic and functional outcome in 28 women after vaginoplasty using laparoscopic Davydov operation. This surgery includes three steps: two laparoscopic and one perineal. The patient then has to use a mould or a vaginal dilator for 1 month. The functional outcome was assessed by a brief and valid self-report questionnaire evaluating female sexual life (Female Sexual Function Index, FSFI). A control group was recruited to compare the results. **RESULTS:** Two intra-operative bladder and ureteric injuries were repaired without sequels. Two post-operative complications were observed: one abdominal migration of the mould, which was treated successfully with the laparoscope, and one vesico-vaginal fistula. No patient was lost to follow-up. The anatomical result was judged to be satisfactory (>6 cm) in 26 of the 28 patients: the mean vaginal length was 7.2 ± 1.5 cm. Among the 28 operated women, 19 had a good or very good result. No statistical difference was found between our operated patients and French controls in all six domains of the FSFI. **CONCLUSIONS:** Laparoscopic Davydov may be considered a good option for the surgical treatment of women presenting vaginal agenesis. This technique offers advantages such as: short operating time and hospital stay, no particular instrumentation required and no external scars. Sexuality approaches so-called 'normal sexuality'.

Key words: laparoscopic Davydov/peritoneum/Rokitansky syndrome/sexuality/vaginal agenesis

Introduction

Complete vaginal agenesis associated with uterine agenesis or hypoplasia (Mayer–Rokitansky–Kuster–Hauser syndrome) is uncommon (incidence: one case per 5000 living female neonates). The patients present as adolescents with primary amenorrhoea coexisting with normal secondary sexual characteristics. Their ovarian function is normal and their karyotype is 46,XX (Edmonds, 2003).

The diagnosis of vaginal aplasia is emotionally traumatic for these young women. The physician's approach is very important for their psychological well-being and future medical management. At present there is no consensus regarding the best management option. As stated by the American College of Obstetrics and Gynecology (ACOG Committee Opinion, 2002), non-surgical treatment is the first choice. In patients who refuse or fail to achieve a functional vagina with passive dilatation, a surgical approach may be required. But the surgical reconstruction has to be postponed until such time as the patient is emotionally mature and motivated to maintain a neovagina once it has been created.

The surgical techniques are designed to create a canal of adequate size oriented in the correct axis by developing the space situated between the bladder and rectum. The newly created space may be covered by different materials: skin graft taken from the buttock (McIndoe, 1995; Klingele *et al.*, 2003), peritoneum (Davydov, 1969; Davydov and Zhvitiashvili, 1974; Friedberg, 1974), amnion (Nisolle and Donnez, 1992) and artificial dermis (Noguchi *et al.*, 2004). An alternative is to use intestine: ileum, caecum, sigmoid colon (Novak *et al.*, 1978; Parsons *et al.*, 2002; Crouch and Creighton, 2003). An alternative approach is exploited by the Vecchiotti's procedure, which achieves the dilation by passive traction on an ovoid device placed in contact with the vestibule and attached to the abdominal wall by traction wires (Borruto, 1992). Whatever the technique used, its success or failure depends largely on the cooperation of the patient.

The aim of this paper is to assess the anatomical and functional outcomes after creation of a neovagina using Davydov's technique. The anatomical result has been assessed clinically and the sexual result by a standardized questionnaire: the

Female Sexual Function Index (Rosen *et al.*, 2000). A control group with characteristics similar to those of the study group was recruited.

Materials and methods

Technique

The laparoscopic Davydov includes three steps (Dargent *et al.*, 2004).

First laparoscopic step

The aim of the first laparoscopic step is to separate the urinary bladder and rectum. The pelvic peritoneum is opened transversely at the bottom of the pouch of Douglas. The incision can be performed either in front of the transverse bundle joining the two ovaries and tubes or behind it. A 27–28 Hegar dilator is placed in contact with the vestibulum and pushed upwards. A cold light cable is connected to this dilator to form a trans-illuminating device, and once the tip of the dilator becomes visible this indicates that vestibulotomy has been achieved.

Perineal step

Once the position of the patient has been slightly changed (flexion of the thighs) the two borders of the peritoneal incision are drawn downwards and stitched to the lips of the vestibulotomy. In those cases where the tissues interposed between the vestibulum and the peritoneal cul-de-sac are thick and the tip of the luminous guide cannot easily be identified during the first laparoscopic step, the vestibulotomy is performed during this perineal step by making a classical H-shaped incision. If the labia minora are hypertrophic and if the vestibulum is reduced, the skin of the labia can be used for the anastomosis with the peritoneum and making the inferior third of the neovagina (nymphoplasty) by partially dividing them over a short length.

Second laparoscopic step

The vault of the neovagina is created during the second laparoscopic step. A so-called purse-string stitch is performed by taking peritoneum of the bladder, the right-sided round ligament, the right-sided 'utero-ovarian' ligament, the pelvic peritoneum between the right ovary and rectum (beware of the ureter) and then the right-side surface of the rectum before going to its ventral surface to do the same thing in reverse order on the patient's left side.

Two solutions are suggested to avoid the neovaginal cavity collapsing spontaneously. The first involves inserting a double envelope mould which is removed, cleaned, and reinserted every time the patient micturates and/or defaecates. This stays *in situ* until complete epithelialization of the neovagina has occurred. The second solution does not involve inserting anything but the patient is asked to perform dilation herself at least three times a day using the Hegar dilator. The patient is discharged as soon as she is able to take care of her neovagina. A clinical assessment by a member of the team or by the referring gynaecologist is arranged. Sexual intercourse is recommended as soon as epithelialization of the neovagina allows this to occur.

Patients

Between February 1996 and March 2003, 28 patients with complete vaginal agenesis had surgery in the Gynecology Department of Hospital Edouard Herriot in Lyon, France.

Separation of the bladder and rectum was done in front of the transverse centro-pelvic bundle in the first 15 patients (first group: February 1996 to July 2001) and behind it in the other 13 (second group: August 2001 to March 2003). The vestibulotomy was performed

Table 1. Clinical characteristics of the 28 women with Rokitansky syndrome who underwent the laparoscopic version of the Davydov method for creation of a neovagina

	First period	Second period	Total
No. of patients	15	13	28
Age (years; mean \pm SD)	17.0 \pm 1.4	22.0 \pm 4.5	21.6 \pm 6.2
Previous unsuccessful operation	1	3	4
Associated malformations	8	6	14
Dissection	Ventral	Dorsal	28
Mould	Yes	No	28

laparoscopically in 23 cases and via the perineum in the other five cases. The perineal vestibulotomy was completed by a nymphoplasty in these five cases to which one more case should be added: six cases of nymphoplasty equally distributed in the two groups.

The mean age of the patients was 17.8 \pm 3.2 years at diagnosis and 21.6 \pm 6.2 years at surgery (Table 1). Four patients had had previous unsuccessful surgery. Fourteen patients had associated malformations, 11 of them affecting the urinary system including one case of urinary incontinence due to spina bifida. Three patients presented with multiple malformations (cardiac and skeletal abnormalities). Two women suffered from epilepsy.

We assessed functional outcome by a brief and valid self-report questionnaire evaluating female sexual life (Female Sexual Function Index, FSFI). FSFI assesses six domains: desire, arousal, lubrication, orgasm, satisfaction and pain. FSFI full score is between 2 and 36. According to previous reports we considered the functional result to be very good when the FSFI score was $>$ 30, good 23–29 and poor $<$ 23. We compared the functional outcome of our population with a control group consisting of 28 age-matched (\pm 2 years) women who came with patients to our outpatient clinic. These volunteers were aged less than 45 years and they didn't have any gynaecological problem. The two groups were comparable with respect to race, education and social status. Data from subjects who had no sexual activity within the past month were excluded from final analysis.

Statistical analysis

The associations between the discrete variables were assessed using χ^2 test with Yates's correction when appropriate. Fisher's exact test was used when necessary. Continuous variables were compared by Student's *t*-test. $P < 0.05$ was considered statistically significant. The follow-up period was measured from the date of the surgery to October 2004. Statistical analysis was performed using the SPSS software (SPSS Inc., Chicago, IL, USA).

Results

The surgery and immediate post-operative course were uneventful in all cases except in four in the first group of 15 patients (separation of bladder and rectum in front of the transverse centro-pelvic bundle): two intra-operative bladder and ureteric injuries were immediately recognized and repaired laparoscopically with no subsequent problem, one intra-abdominal migration of the mould presented on day 2 and was managed successfully with the laparoscope, plus one vesico-vaginal fistula which was repaired on day 50 by the suprapubic transvesical approach and subsequently, after failure of this first attempt, by a transvesical transperitoneal approach. The average 'operative room' time was 119 \pm 39.4 min: 145 \pm 28.6 min for the first group and 90.5 \pm 28.6 min for the second ($P < 0.001$). The

average hospital stay was 8.1 ± 2.0 days: 9.3 ± 1.9 days for the first group and 6.8 ± 1.2 days for the second ($P < 0.001$).

The anatomical result was judged to be unsatisfactory (vaginal length < 7 cm) at the first assessment in five cases, including four in the first group and one in the second. In these five cases, dilation was performed under general anaesthesia after incision of the vault of the neovagina. This complementary surgery was done 2–20 months after the initial surgery. Ambulatory monopolar cauterization and/or laser vaporization were carried out for two additional patients in the first group because of granuloma of the vaginal vault.

The anatomical results, considered to have stabilized, were assessed after a mean of 43.8 months (range 15–100). No patient was lost to follow-up. Length, diameter, softness and smoothness (no granuloma) of the neovagina were assessed. All patients had a soft and smooth vagina whose length, at bidigital assessment, was 7.2 ± 1.5 cm: 7.3 ± 1.7 cm in the first group and 7.0 ± 0.7 cm in the second (not significant). The associated nymphoplasty which made the surgery and the hospital stay longer (147 ± 45 versus 112 ± 35 min and 9.2 ± 2.7 versus 7.9 ± 1.7 days, not significant) did not increase the rate of complications and allowed a certain benefit with regards to length (7.6 ± 1.3 versus 7.0 ± 1.4 cm, not significant).

The sexual result, as stated previously, was assessed using the FSFI. All patients were contacted. All of them had attempted to have sexual intercourse. The average delay between surgery and the attempt was 7.0 (range 1–48) months: 9.6 (1–48) months in the first group and 4.1 (1–9) months in the second (not significant). At the time of the inquiry, one patient was not sexually active and two patients refused to answer. The full FSFI score, for the 25 assessed patients, was on average 26.54 ± 5.6 with no difference between the two groups and no difference either between the patients submitted and not submitted to nymphoplasty.

The stories of the two women who refused to answer Rosen's questionnaire are perhaps the more informative in our inquiry. The first was the 45 year old patient who had re-operation 20 years after a first fruitless attempt. She had, after the second surgery, 'normal' sexual intercourse and family life but she told us that it was too late for her to answer to such a question. The second patient was 23 years old. She was fully satisfied with her sexuality and relationship but shocked by the questions concerning sexuality which never was her main problem (fertility was the issue from the very beginning and still is).

Among the 25 assessed patients. Six had a poor FSFI score (Table II). One of them had a very complex personal story. She was born with spina bifida and underwent various surgeries in spite of which she still needed to self-catheterize and experienced recurrent urinary infections. She was sexually abused by her father-in-law as an adolescent. One year after the laparoscopic Davydov the vaginal length was 8 cm. No sexual intercourse had been attempted and autodilation was regularly performed. When sexual intercourse started the autodilations became painful and the length of the vagina collapsed to 5 cm. The FSFI was 11.4. For the other five poor results the scores were between 19 and 22. In all of these patients the factors 'lubrication' and 'pain' pulled the global score downwards but the

Table II. Assessment of sexual function by the FSFI (Female Sexual Function Index) in women who had surgery and in an age-matched control group

	Cases ($n = 28$)	Controls ($n = 28$)
No answer	2	1
No sexual activity ^a	1	2
Desire score	4.4 ± 0.9	4.4 ± 0.8
Arousal score	4.4 ± 1.1	4.6 ± 0.8
Lubrication score	4.5 ± 1.4	4.9 ± 0.9
Orgasm score	4.1 ± 1.3	4.4 ± 1.2
Satisfaction score	4.6 ± 1.1	4.5 ± 1.1
Pain score	4.4 ± 1.4	5.1 ± 1.1
Full FSFI score	26.5 ± 5.6	27.9 ± 4.5
>30	7	9
24–29	12	13
<23	6	3

^aConsidering the past month.

There were no significant differences between cases and controls.

other factors were at the highest or close to it, including the factor 'orgasm', with the exception of one patient who could obtain orgasm by clitoridian masturbation only—as before surgery.

Concerning the patients with a good or very good result (FSFI > 24), the individual variations had the same origin as the complaints expressed by the patients with a poor result, i.e. low scores in the fields of lubrication and pain, but this deficit did not pull the global score to < 23 . On the other hand no significant difference was found between the patients and the controls, at least if the French controls are taken in consideration (Table II).

Discussion

There are just two published series of the laparoscopic Davydov operation (Adamyán, 1995; Soong *et al.*, 1996). This surgery is easy to learn and can be done by a gynaecological team alone. The anatomical results and complication rates (4/28, 14.3%) of our series are the same as those of other techniques. Our study is the first to assess sexuality by a self-report questionnaire after the laparoscopic Davydov operation. Overall the full FSFI was not significantly different in the patients who had surgery as compared to the controls we had recruited (Table II), but there was a trend to a less satisfying sexual life in those patients that had had the laparoscopic Davydov. Lack of satisfaction was greatest in relation to those questions that assessed comfort and pain.

All our patients are satisfied with their surgery. They finally feel 'normal', they get more assurance and their quality of life has improved. Many of these women are obsessed by the idea that regular sexual activity is necessary to keep their vagina open. For this reason they are afraid whenever they do not have a partner. Besides, when they meet a new partner they may be afraid that he will notice their genital malformation.

Listening and providing information are the cornerstones of good comprehensive management of vaginal agenesis. Irrespective of the resistance the therapist meets from individuals (starting with him or herself) or groups, all questions concerning sexuality and fertility must also be considered including questions about IVF and surrogate mothers (Esfandiari *et al.*, 2004). Forums offered by internet websites dedicated to this topic can

be of great help. When the question of surgery arises, a standardized questionnaire such as Rosen's can provide a snapshot and be very helpful as 'an Ariadne's thread' for post-operative management. This is just as important as the pre-operative care.

In this context where surgery is only a part (and not the major part) of management, the key word must be simplicity. Apart from the McIndoe operation and its unattractive associated scarring, four procedures are vying for first place. One is carried out vaginally: peritoneal vaginoplasty (Tamaya and Fujimoto, 1997); and the other three are performed with the use of the laparoscope, i.e. without leaving visible scars: the laparoscopic Vecchietti (Borruto *et al.*, 1999; Fedele *et al.*, 2000; Brun *et al.*, 2002), the laparoscopic sigmoid colpoplasty (Communal *et al.*, 2003; Darai *et al.*, 2003; Urbanowicz *et al.*, 2004) and the laparoscopic Davydov. Tamaya *et al.* reported a limited series of five cases of peritoneal colpoplasty performed through the vagina. The authors reported that the described technique is easy to perform and that there were no complications in the five cases. But the authors did not clearly evaluate the sexual results of this technique.

Sexuality after the laparoscopic Vecchietti is poorly documented. In his last survey, Fedele *et al.* (2000) reported on 52 cases. Assessment of the vagina after stabilization of the result revealed it to be >7 cm in 50 (96%) cases. All patients succeeded in having sexual intercourse, 43 (82.6 %) of them had a stable sexual relationship and 49 (94.2%) were globally satisfied with their sexual life. Three per-operative complications occurred (three accidental bladder perforations). The surgery undoubtedly deserves the label of simplicity. The problem of post-operative pain, however, remains significant as traction on the wires is increased on a daily basis.

By using the laparoscopic bowel vaginoplasty, post-operative pain is more easily managed but this surgery, because it involves the intestine, will never be without danger. There are no data currently available regarding the sexual results but one can anticipate, if one considers the results of the laparotomy approach to this operation, that these results will be excellent. In the series of Communal *et al.* (2003), a sigmoid neovagina was created in 16 patients with Rokitansky syndrome. Functional results were determined in the 12 patients operated on >6 months earlier. Eleven patients (91%) answered the FSFI questionnaire: eight had regular vaginal intercourse; three had no sexual relationship. All the patients who had sexual intercourse, presenting good full FSFI scores, experienced some pain: either superficial or deep dyspareunia or abdominal pain associated with vaginal penetration. However, comparing our surgical patient group with women with a sigmoid neovagina, the sexual results seem identical.

In conclusion, sexuality overall after surgery for complete congenital agenesis of the vagina approaches so-called normal sexuality. Minimal access surgery facilitates integration of surgery into the management of those young women affected by this syndrome without jeopardizing the chances of success. Among the various laparoscopic operations, our preference is the laparoscopic Davydov because of its easiness, its good sexual results and its relatively low rate of complications.

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