



Place of fertility sparing surgery in young women with cervical cancer

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Introduction

Cervical cancer is the second commonest malignancy to affect women worldwide and it remains one of the main causes of death. About half a million new cases are diagnosed annually and 80% of these occur in less developed countries. This poses a major international public health challenge¹. Increasingly more younger women (24–35 years) are diagnosed with cervical cancer, and for them quality of life is a major factor influencing treatment as they can expect to live long after successful treatment. It is estimated that in UK and USA, 43% of cervical cancer will be diagnosed in women younger than 45 years of age^{2,3}.

In western countries women often delay childbearing for social, financial and professional reasons, utilizing reliable methods of contraception. As a result they wish to consider fertility sparing treatment when their early stage cancers are diagnosed. The scenario in the developing world is different. For various social and cultural reasons the women of a similar age group will most probably have completed their family.

More women in their late 30s to early 40s are attempting to get pregnant for the first time. Fertility preservation has therefore become a major issue in the management of

cervical cancer. The standard management of early stage cervical cancer is either surgery in the form of radical hysterectomy and pelvic lymphadenectomy or chemoradiation. Both lead to loss of fertility potential. Radical vaginal trachelectomy is a fertility sparing procedure developed over the last 12 years for early cervical cancer. It allows preservation of the body of the uterus and reproductive function whilst still treating the patient following acceptable oncological principles. The procedure represents a half or bottom part of a radical vaginal hysterectomy giving adequate local resection of the primary tumor. A laparoscopic pelvic lymphadenectomy is carried out at the same time. It is a real breakthrough in the history of surgical management of early cervical cancer since the era of Wertheim. However, Shepherd⁴ states that Novak had described a similar vaginal procedure in 1948, which was modified to abdominal route by Amburel⁵ in 1957. It was Dargent et al⁶ who pioneered this procedure and published their first series in French literature in 1994. Later Shepherd et al⁷ developed a modification of this procedure. Now over seven centers all over the world are performing this procedure for nearly 20 years. Many investigators have published their initial experience with encouraging results⁸⁻¹⁴. Extended series of follow up data have been published after gaining considerable experience¹³⁻¹⁵. Accumulated experience indicates that the oncologic outcomes following this procedure are reassuring and similar to standard radical hysterectomy, and show acceptable recurrence rates. Pregnancy outcomes following radical trachelectomy are encouraging. A majority of women can anticipate spontaneous conceptions and delivery of live babies, though there is a risk of prematurity. Case series of successful pregnancies following radical trachelectomy have already been published¹⁶⁻¹⁹. This article reviews the selection of patients, clinical decision making for suitability

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of women for fertility preservation, and the overall world experience in radical trachelectomy. The overall evaluation in management and applicability of such procedures in the Indian subcontinent is addressed as well.

Underlying principle

Radical trachelectomy technique involves a laparoscopic pelvic lymphadenectomy followed by vaginal resection of a portion of the cervix, parametrium, and upper one third of the vagina. The cervix is transected at the lower uterine segment leaving the upper isthmus and uterine corpus intact to allow for pregnancy (Figure 1). A permanent prophylactic cerclage is placed for prevention of premature delivery of the pregnancies following this procedure.

Surgical technique

The detailed description of this procedure has been extensively described elsewhere⁴ and briefly summarised here. This procedure is performed in two stages, initially laparoscopically and then vaginally. The procedure commences with a complete laparoscopic evaluation of

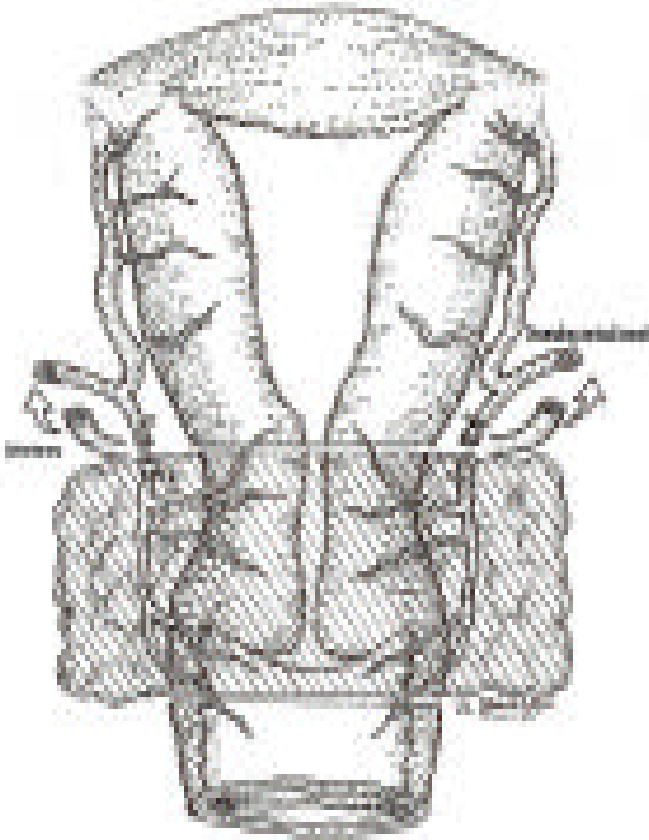


Figure 1. The amount of tissue removed in radical trachelectomy.

the peritoneal cavity, including a detailed examination of the fallopian tubes and ovaries. Bilateral pelvic lymphadenectomy is performed with clearance of lymph nodes from the circumflex iliac vessels to just above the bifurcation of the common iliac artery with removal of obturator, internal iliac and external iliac nodes.

The second phase begins with development and preparation of the vaginal cuff vaginally by incising the vaginal epithelium circumferentially about 2 cm from the cervix. The vesicovaginal space is defined anteriorly in order to mobilize the bladder upwards to the level of uterovesical peritoneum. Care is taken to avoid opening it. The internal cervical os or isthmus is identified. The length of the cervix may be confirmed by passing a uterine sound and comparing the measurement with that obtained by preoperative magnetic resonance imaging (MRI). The paravesical space is developed. The knee of the ureter is clearly identified by palpating the bladder pillar between two fingers. The bladder pillars are divided. The descending branch of the cervical artery is clamped, cut and ligated. The rectovaginal septum and pouch of Douglas are identified posteriorly by blunt dissection and mobilization, avoiding opening the pouch if possible. This is to avoid contamination of the operative field from the vagina and to reduce the risk of pelvic infection. The lateral ligaments are clamped and divided. The parametrial tissue is excised by ensuring lateral division of cardinal and uterosacral ligaments. The excision of the trachelectomy specimen is accomplished at the level of the internal os by inserting a Hegar dilator (size 6) in the endocervical canal. In the reconstruction phase, a permanent cerclage is placed around the isthmus with No.1 nylon suture for supporting future pregnancies. The vaginal epithelium is reanastomosed to the isthmic endocervical epithelium at the uterine margin ensuring that the canal is open. The remaining epithelium is closed transversely.

Frozen section assessment of the endocervical margin of the specimen is obtained to ensure clear disease free endocervical margins. Indications to proceed for definitive treatment in the form of radical hysterectomy or chemotherapy include lymph node involvement and incomplete resection with positive margins. The patient is advised to use contraception for 6 months before considering pregnancy.

Selection of patients

Selection of patients for performing radical trachelectomy is crucial to get optimal results. There are several key factors that influence the decision to proceed with this surgery.

i) Patient profile

Firstly there must be a strong desire on the part of the patient, to retain fertility potential. A complete obstetric and gynecological history is obtained to identify patients with underlying potential infertility problems. Infertility work-up to document fertility potential is not required prior to the procedure. Also, a documented history of infertility should not be considered a contraindication to the procedure, since women with infertility problems have been able to conceive after trachelectomy, with or without assisted reproductive technologies⁹. Women who have delivered several children before should not be denied this procedure either as they may wish to have more children in the future. Age should not be considered a contraindication and the procedure may on occasion be offered to women over the age of 40 whilst understanding that their fertility potential is obviously less.

ii) Extent of the disease

The extent of the patient's cancer is a major determinant of whether fertility sparing surgery should be recommended. The ideal candidates for the procedure are small volume FIGO Stage IB1 cervical cancers, in whom the disease is confined to the cervix, with no evidence of direct spread to either uterine corpus or parametrium. Vertical tumor extension towards the isthmus or myometrium is always very difficult to detect clinically. Understanding the natural history of cervical cancer will help in selecting the patients for this procedure. The tumor spread occurs predominantly in a lateral direction along the cardinal ligaments and vertical spread is not the usual pattern of extension occurring mainly in late stage disease. For patients undergoing standard radical hysterectomy, vertical extent of the tumor is not significant because the tumor is removed with the uterus. However, in patients in whom a trachelectomy is planned, it is of paramount importance to rule out proximal extension into endocervical canal and body of the uterus. The proximal end of the tumor should be at least 1 cm away from the internal cervical os. Clinically the level of the internal os is difficult to establish accurately. A preoperative MRI is probably the best imaging technique to evaluate accurately the endocervical tumor extension, the presence of residual disease after conization, and cervical length including identification of the isthmus and internal os. The sensitivity of MRI to detect tumor extension beyond the internal os is 100%²⁰. Recently De Souza et al²¹ used a endovaginal coil MRI as an alternative to MRI for assessing tumor volume and identify early parametrial spread (Figure 2). This technique has high sensitivity even for cervical lesions less than 1 cm³. Hence MRI is of great value in accurate mapping of tumor distribution for safe planning of

trachelectomy and selection of suitable patients. But nodal involvement is difficult to diagnose by MRI^{20,21}. However, work is currently being undertaken on use of MRI lymph node specific contrast agents like small iron oxide particles, which are taken up by normal lymph nodes but not by nodes involved by tumor²², and on sentinel node identification with radioisotopes^{23,24}.

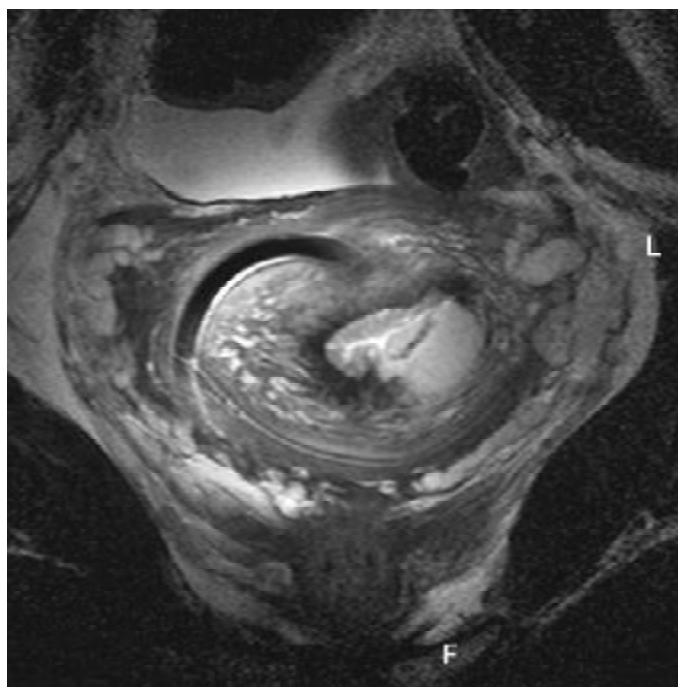
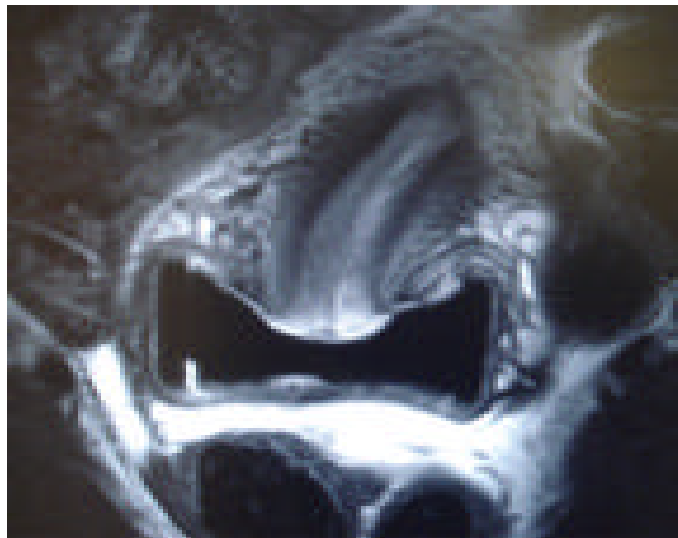


Figure 2 Endovaginal coil MRI of cervix (A: Cross section, B: Longitudinal section)

iii) Size of the tumor

Increasing size of the tumor leads to extension to the lower uterine segment and parametria. The risk of nodal metastasis is directly related to increasing tumor volume.

Hence small tumor volume has been identified as important criteria for selection of patients for radical trachelectomy. It is becoming apparent that the vaginal approach to trachelectomy is inappropriate if the tumor is more than 2 cm in diameter. Moreover, about 12% of planned vaginal trachelectomies are abandoned because of unexpected findings, and the outcome in these women is very poor¹⁶. The risk of recurrence following radical trachelectomy is increased when the tumor size exceeds 2 cm^{15,16}. Hence the patients are suitable for radical trachelectomy only if their longest tumor diameter is less than 2 cm. However exophytic lesions with a narrow base could be a reasonable exception to the 2 cm size criteria^{12,16}.

iv) Histopathological features

The histological type of tumor does not appear to be a significant risk factor for recurrence except in the case of rare aggressive tumor subtypes such as small cell neuroendocrine tumors with a propensity for rapid and widespread metastasis. These tumors are clearly associated with a higher risk of recurrence and death which have been reported following radical trachelectomy^{14,16}. Hence such high risk type of tumors should probably not be offered radical trachelectomy as they may need more aggressive therapy with chemoradiation.

Adenocarcinomas per se did not appear to be associated with a higher risk of recurrence^{12,15} and thus should not be considered a contraindication for radical trachelectomy. However adenocarcinoma is more likely to be found at the endocervix close to the isthmus, and also to have skip lesions. Hence special care is given to case selection in this type of tumor. With adenocarcinomas, it is essential to ensure removal of the entire endocervical canal in view of the possibility of skip lesions and field change. There has been a suggestion that adenosquamous histology may also be associated with a higher risk of recurrence. A recent study concluded that adenosquamous histology is predictive of disease recurrence and decreased survival even in low-risk stage IB1 disease²⁵. However this has not been confirmed by other studies.

v) Lymphovascular space invasion

The patient should have a low risk of nodal metastasis to be eligible for radical trachelectomy. The risk of spread via either blood borne or lymphatic metastasis has been related to features of the tumor biology. Whether the presence of lymphovascular space invasion (LVSI) is a contraindication for trachelectomy is debatable. A recent study demonstrated that the mere presence of LVSI is not relevant but it is the quantity of LVSI that determines outcome and recurrence in early cervical cancers²⁶. The

presence of few foci of LVSI alone should not be an exclusion criteria, but extensive LVSI is probably a marker of aggressiveness, and the risk should be weighted up in discussion with the patient. However, it should be pointed out that the recurrence rate after radical hysterectomy does not appear to differ significantly²⁷. Hence presence of isolated LVSI in the absence of other poor prognostic factors such as confluent LVSI, deep invasion and size more than 2 cm, is not a contraindication for radical trachelectomy.

vi) Lymph node status

Metastasis in the lymph node is a contraindication for radical trachelectomy for fertility preservation. Such a finding requires postoperative chemoradiotherapy, which renders women sterile. Lymphadenectomy is performed first and if suspicious nodes are found they are examined by rapid frozen section before deciding to proceed with radical trachelectomy. If nodes are positive planned radical trachelectomy is abandoned and chemoradiation is offered instead. As a general principle, it seems wise to abandon radical trachelectomy during surgery when it is clear that it will not achieve the goal of fertility preservation.

vii) Patient preference

Lastly, but most importantly, woman's preference should be taken into account. For some women the loss of the uterus is psychologically unacceptable and this should be respected. If the lesion is small and good oncologic outcome is predicted, the indication for trachelectomy may be expanded as an acceptable option for these patients where fertility is not a concern. This approach opens up a new outlook to the treatment of early cervical cancer in the context of reduced surgical morbidity as compared to conventional radical hysterectomy²⁸. However there are specific short- and long-term physical and psychological morbidities associated with radical trachelectomy.

Preoperative counseling of patients undergoing this procedure

A very thorough and extensive counseling needs to be given to the patient, spouse or partner, and immediate family members. It may be necessary to have multiple counseling sessions to clarify their questions and needs. The decision to proceed with a fertility sparing surgery is a patient-driven process. She should be part of the decision making while considering her wish to retain fertility.

When discussing the option of fertility sparing treatment with young women the standard treatment currently available should be presented initially. Any deviation from standard

treatment with the objective of preserving fertility must be discussed in the context of associated risk. It is important to stress that conventional accepted treatment remains either radical hysterectomy or chemoradiotherapy. During the informed consent process the lack of extensive experience with this new procedure is highlighted. The available evidence on disease control and fertility, and a limited long-term follow-up after this procedure should be mentioned. She must clearly understand that this is still a new procedure and not a standard recommended treatment as only a few centers have built up a significant experience. The risks and complications of this procedure vis-a-vis those of the standard surgical or radiation therapies need to be addressed. This procedure is offered as an alternative therapy with modifications of standard treatment.

The nature of the procedure is clearly outlined. The realistic possibilities of successful pregnancy following this procedure are explained. Particularly the potential obstetric problems in the event of a future pregnancy are discussed. Women are informed about the risk of giving birth to extremely premature babies due to premature rupture of membranes (PROM) and the possible neurological consequences to a child if this were to happen. Increased chance of second trimester pregnancy losses is addressed. The cause of this again is PROM from ascending chorioamnionitis. Because of this reason women are counseled to book their pregnancy in a high risk pregnancy unit with the facility of neonatal intensive care. Besides, a need for cesarean section for delivery because of the permanent cerclage, is emphasised. The potential risk of recurrence of 4 %¹⁷ and of death of 1%¹⁵ should be discussed as well.

As part of preoperative counseling the possibility of unexpected discovery of metastatic disease or close surgical margins, and the need for extensive surgery or radiotherapy compromising her fertility is addressed. The possibility of finding extensive tubal disease, endometriosis, or adhesions is also discussed. A clear decision as to how to proceed, should these findings suggest that assisted reproductive therapy would be necessary to achieve pregnancy, should be taken after discussion. A further point which should be emphasized is that there is no guarantee of fertility after the procedure, taking into account the coincidental implications of male factor (partner or husband) issues.

Preoperative work up

The fact that more extensive tumor extension is discovered at the time of surgery in about 10% of patients emphasizes the importance of a careful and thorough preoperative metastatic survey. Stage of the disease, histology, and

lesion size are important preoperative prognostic factors. Some of these criteria are discovered during intraoperative assessment (tuboperitoneal factors of infertility, endocervical involvement, lymph node metastasis) or postoperative period. Hence a critical stepwise clinical evaluation is required throughout the management to guide the decision for proceeding with fertility preservation. Precise preoperative evaluation to assess the tumor volume and endocervical extension by colposcopy, examination under anesthesia (EUA), and MRI of the pelvis is mandatory. Particular attention is paid to careful measurement of the length of the cervix and the depth of the uterine cavity, so that the exact amount of tissue is excised during surgery. Routine investigations such as complete blood count, serum biochemistry and chest x-ray are undertaken as for any radical surgery. Any other special preanesthetic work up as advised by anesthetists for fitness for surgery is carried out at a preadmission clinic. EUA is an integral part of assessing patients for any radical procedure. All patients should be formally assessed by staging EUA, cystoscopy, and sigmoidoscopy to rule out any suspicious lesions suggestive of involvement of bladder or rectum. Pelvic and bimanual rectovaginal examination should be performed to confirm that there is no evidence of local spread outside the cervix. Careful examination is needed to assess the technical feasibility of a vaginal procedure as most of these women are nulliparous. Histopathological review of the specimens by pathologists experienced in the field of gynecologic malignancy with careful reporting of the prognostic factors including the type and grade of tumor, depth of invasion, and LVSI will aid in deciding the suitability for fertility sparing surgery.

Taking all the above factors into account, the patients who are suitable for treatment by radical trachelectomy will have to meet the following set of selection criteria.

1. Desire to preserve fertility.
2. FIGO stage IA1 with presence of vascular space invasion or IA2 and IB1.
4. Lesion size less than 2 cm diameter confined to the cervix.
5. No involvement of the upper endocervical canal as determined by EUA, colposcopy and MRI.
6. No evidence of pelvic node metastasis.
7. Squamous cell carcinoma or adenocarcinoma histological subtypes.

However, as more data and experience accumulate, these criteria may have to change in the future.

Special training and infrastructure requirement to perform radical trachelectomy

Radical vaginal trachelectomy is a technically challenging procedure. The skills required to perform this procedure are very different from those needed to perform a standard radical abdominal hysterectomy. It requires special training in both radical vaginal surgery and laparoscopic pelvic sidewall dissection. This technique has not been taught during traditional gynecologic oncological training, so it is not widely available. Currently only few gynecological oncology centers worldwide have built up a significant experience and expertise to undertake this fertility sparing surgery. There is need for appropriate training in this procedure.

Even during benign gynecological surgery there is a scope for learning this technique. There are a variety of vaginal surgical procedures being performed routinely in many gynecological units world wide. Special attention can be paid while performing a simple vaginal hysterectomy with pelvic floor repair for women with pelvic organ prolapse. Since the tissues are lax and lying outside the introitus, the anatomy can be easily appreciated. Careful palpation of ureter in bladder pillars can be routinely done at this point. This experience is required for ureteric dissection while performing radical vaginal trachelectomy. During a variety of conservative surgical procedures for pelvic organ prolapse the pelvic ligaments are easily delineated. In Fothergill or Manchester operation the cardinal ligaments are treated and anchored in front of the cervical stump, after amputation of the cervix in young women. In Shirodkar's vaginal operation for prolapse the uterosacral ligaments are mobilized and stitched in front of the cervix. All these procedures will offer an form of experience in vaginal surgical anatomy which is required for performing radical vaginal trachelectomy. There is ample opportunity to acquire the basic surgical skills and experience during routine vaginal surgery, which are necessary to perform a procedure like radical vaginal trachelectomy.

Laparoscopic pelvic lymphadenectomy mandates an advanced laparoscopic training. The modern operation theater with necessary endoscopic instruments and advanced digital imaging system will give superb image resolution to perform laparoscopic surgery. The use of special laparoscopic instruments like, harmonic scalpel, ligasure etc, will facilitate the laparoscopic surgery.

A multidisciplinary team approach where expertise of a gynecologic oncologist, gynecologic pathologist, radiation oncologist, medical oncologist, and a radiologist is critical in optimizing treatment planning for potential fertility

preservation. Clinical nurse specialist who is also an integral part of the multidisciplinary gynecologic oncology team plays a vital role in preoperative and postoperative counseling of these patients. She provides emotional and psychological support to these young anxious patients who require cancer treatment along with fertility preservation.

The complication of greatest concern is that of second trimester loss and premature labor in pregnancies following radical trachelectomy. Hence established high risk pregnancy units are required to manage such pregnancies. Successful pregnancies must be delivered by a classical cesarean section, since the formation of lower segment is not adequate because the isthmus is partially removed during trachelectomy. A transverse incision risks the extension, tearing the uterine vessels. Since the posttrachelectomy cesarean sections are difficult with risk of hemorrhage they should be undertaken by an experienced senior obstetrician in a place where adequate blood transfusion facilities are available. There should be level three intensive neonatal care units available to take care of what will almost invariably be a premature baby following pregnancy after radical trachelectomy. They should have considerable experience in managing the extreme premature babies of less than 32 weeks. Perhaps trachelectomy associations should be established where the patients who have undergone such procedures communicate to share their experience and discuss their emotional problems to get social support. The clinical nurse specialist should participate and coordinate such meetings.

It is important to understand that radical vaginal trachelectomy is not yet the standard of care for management of early cervical cancer to preserve fertility. In view of the experimental nature of the procedure with limited long term follow up data on outcome, it should be carried out as a part of research program and there is need to obtain local ethical committee clearance before undertaking such procedures.

It is essential to get training in this field to offer such procedures when a suitable woman comes for fertility sparing surgery. Although it may be possible to actually learn these surgeries by visiting centers where they are being performed, it is unpredictable when such suitable cases would come up there.

Literature on radical trachelectomy

Radical trachelectomy which fulfils the needs of radicality along with the possibility of preserving childbearing capacity is a relatively new surgical technique that has been performed by only a few centers. Several large series

have been reported, with a number of successful pregnancies following radical trachelectomy. To date, over 535 cases have been reported worldwide, carried out in seven centers in UK, France, Germany, USA and Canada. Dargent and his team¹⁵ started performing this surgery in France in 1987 and have reported 95 cases till 2002. In 1991 Plante et al¹⁶ from Canada started performing this procedure and reported 82 cases in 2004. In 1994 two other centers commenced their work on fertility sparing surgery viz, Shepherd et al¹⁷ at London and Covens et al⁹ at Canada. Since 1995 three more centers started performing radical trachelectomy, two centers from USA (Schlaerath et al¹² and Burnett et al¹³) and one from Germany (Hertel et al¹⁴). Shepherd and his team¹⁷ have modified the technique and have the largest reported experience of performing 123 cases of radical trachelectomy to date.

Cumulative data of tumor characteristics of patients who

underwent radical trachelectomy is presented in Table 1. Five hundred and thirty two cases of radical trachelectomy have been reported by seven centers world wide. The staging breakdown indicates that the majority of cases are stage IB1 accounting for 65.8 % of the cases treated. In 13.9% and 17.5% of the cases trachelectomy was done for stage IA1 and IA2 respectively. 64.1% were squamous cell carcinoma and 32.3% adenocarcinoma. LVSI was present in 28.9% of cases. In 92.4% of the 511 in whom tumor size was reported, the tumors were ≤ 2 cm.

Experience is accumulating regarding the recurrence patterns, fertility outcome and other benign gynecological consequences following radical vaginal trachelectomy. The outcome of radical trachelectomy is summarised in Table 2. The cumulative data confirm an excellent oncological outcome with a recurrence rate of 4.3% and a death rate of 1.5% which are comparable to the results following standard radical hysterectomy for this stage of cervical cancer. The overall survival rate is excellent with a 5 year disease survival of 95%^{14,16}.

Table 1. Literature review of tumor characteristics

Author	Shepherd et al ¹⁷	Hertel et al ¹⁴	Dargent et al ¹⁵	Steed and Covens et al ²⁹	Plante et al ¹⁶	Burnett et al ¹³	Schlaerth et al ¹²	Total n (%)
Number	123	108	95	93	82	21	10	532 (100)
Median age (years)	30.6	32	32	30	31	30	30.9	
Stage								
IA1	0	18	13	39	4	0	0	74 (13.9)
IA2	2	21	14	22	24	1	8	93 (17.5)
IB1	121	69	56	31	51	20	2	350 (65.8)
IB2	0	0	1	1	0	0	0	2 (0.37)
IIA	0	0	7	0	3	0	0	10 (1.9)
IIB	0	0	5	0	0	0	0	5 (0.9)
Histology								
Squamous	83	75	76	42	49	12	4	341 (64.1)
Adenomatous	33	33	19	44	29	9	5	172 (32.3)
Adenosquamous	3	0	0	0	4	0	1	8 (1.5)
Other	4							
LVSI	39	38	23	31	17	5	1	154 (28.9)
Size								
≤ 2	123	108	74	85	72	NA	10	472/511 (92.4%)
> 2	0	0	21	8	10	NA	0	39/511 (7.6%)

NA - not available in 21 cases. Mean diameter 1.2 cm (range 0.3-3 cm).

Basically in all studies the tumor characteristics for patients eligible for radical trachelectomy were included and once they discovered during the course of treatment that they require completion of treatment in the form of radical hysterectomy or chemotherapy they were excluded from the analysis. But some authors included these in the final analysis to assess recurrence pattern and death to understand the natural history of these patients. Hence there is disparity among authors in reporting the data.

As regards obstetrical outcome majority of women can anticipate spontaneous conception and delivery of viable

baby. Most (70%) patients attempting to conceive succeeded once or more than once. The cumulative

Table 2. The outcome of radical vaginal trachelectomy.

Author (Country)	Total	Pregnancies	Number of women having pregnancy	Number of births at ≥ 32 weeks	Number of births at < 32 weeks	Number of women with recurrence	Deaths
Shepherd et al ¹⁷ (UK)	123	55	26	28	6	3	2
Hertel et al ¹⁴ (Germany)	108 ^a	21 ^b	NA	15	6	4	2
Dargent et al ¹⁵ (France)	95	56	36	34	1	4	3
Covens et al ⁹ / Steed and Covens et al ²⁹ (Canada)	93	22	18	12	2	7	0
Plante et al ¹⁶ (Canada)	82	50	31	36	3	3	1
Burnet et al ¹³ (USA)	21	3	3	3	1	1	0
Schlaerth et al ¹² (USA)	10	4	4	4	2	0	0
Total	532 ^a	211	118	132	21	22 (4.3%)	8 (1.5%)

^a Of the 108 cases of Dargent et al seven were excluded since the study criteria were not met after radical vaginal trachelectomy

^b Pregnancy details are as per personal communication on September 13, 2006 NA - Not available

pregnancy rate is 52.8% ¹⁷. A total of 211 pregnancies have occurred following radical vaginal trachelectomy resulting in 132 live babies. In 21 cases delivery occurred in less than 32 weeks, accounting for 13.7% (21/153) risk of extreme prematurity.

Applicability of fertility sparing surgery in Indian scenario

In India cervical cancer is the leading malignancy among women, with an incidence ranging from 20 to 40/100000 women per year in different parts of the country. This constitutes about 62 % of all female genital malignancies ³⁰. About 130,000 new cases and 74,000 deaths are estimated to occur annually due to cervical cancer ³¹. It amounts to one quarter of the global burden of cervical cancer. The most important challenge India faces is that about 80 % of these cases are diagnosed in late stages where no curative treatment is available and mortality is very high. To reduce the mortality it is important to diagnose the cases early and offer curative treatment.

Currently, evidence for a decrease in incidence and mortality from cervical cancer is available only for conventional cervical cytology and only from developed countries where organised screening program exists. In these countries early cervical cancer and precancerous lesions are diagnosed and treated appropriately leading to cure rates of almost 100%. The success of cervical

cytology in developed countries seems to be due to repeated testing at frequent intervals (1-5 years), high population coverage, and quality controlled procedures. Cytology is not a viable option in many low resource countries like India because of inability to meet requirements.

Alternative methods to cytology like visual inspection with acetic acid (VIA) and visual inspection with Lugol's iodine (VILI) have been evaluated in several cross-sectional studies in developing countries ³²⁻³⁵. The results suggest that these methods can greatly improve women's access to effective services even in the remote and poorest regions of the world. The sensitivity of visual inspection with acetic acid (varying from 66-96%) is equivalent to or better than that of cytology ³⁶. The sensitivity of cytology was improved from 57.4% to 83.3% by adding VIA as an adjunctive test to cytology. The combination of cytology and VILI significantly improved test sensitivity to 88.9% ³⁷. These studies of visual screening methods that are simpler alternatives to cytologic screening have shown promising results.

With this background information on cervical cancer, there are three important issues that need to be addressed in considering the applicability of fertility sparing surgery in the Indian context. First and foremost issue is that the cervical cancer is still being diagnosed in more advanced stages, where it is not even feasible to do radical

hysterectomy. This is mainly due to lack of organised cytological screening programs. The second important issue is the demographic fact that most Indian women have completed their family by the time they are diagnosed with cervical cancer thanks to various social and cultural factors like early age of marriage, poor contraceptive practice, religious taboo, and low educational level. The question of fertility sparing in these women does not arise. The third issue faced by clinicians when treating cervical cancer is the cost factor. Most of the women in whom cervical cancer is discovered are poor and cannot afford to get the appropriate treatment. Unlike in western world, there is no uniform health insurance to cover health cost for treatment. Hence economic viability of such a procedure is challenging keeping in mind the facilities required to perform such a procedures. The cost factor is related not only to surgery but also to management of pregnancies following such procedure. As we understand from the available evidence that frequent episodes of complications in pregnancies following radical trachelectomy are anticipated. This operation is associated with risk of cervical incompetence, second trimester loss, preterm premature rupture of membranes, and premature delivery. These are most challenging problems in posttrachelectomy pregnancies. Invariably all such pregnancies are high risk ones requiring classical cesarean section and neonatal intensive care in a tertiary center. Such facilities do not always exist in most of the institutions across India. Although major corporate hospitals offer such facilities the cost is extremely high and most women simply cannot afford this care. Moreover most of the patients may not be able to comprehend and understand the implications following such a procedure due to low educational level. Hence counseling these patients and their families for radical trachelectomy is challenging.

Nevertheless with wide application of more promising visual screening methods there is a hope for the possibility of increased detection of early cervical cancers in young women in the near future. There is already an evidence of significantly high detection rate (53-67%) of stage I cervical cancers by visual methods of screening, which is demonstrated in cluster randomized trials in India ^{37,38}.

Trends in the incidence and mortality rates of cervical cancer are of considerable interest, as they may shed light on changes in demographic profile of women due to epidemiological transition and increasing affordability, and provide a means of evaluating the need for fertility sparing surgery for early cervical cancer.

Migration of rural population to the cities and increase in urban economy has led to lifestyle changes with

accompanying health hazards. This epidemiological transition is seen in many countries of the world but is nowhere more evident than in India. In relation to cervical cancer the scenario is slowly changing in India. Even though the incidence of cervical cancer is highest among female genital cancers in Indian women, the recent national cancer registry reports are indicating that there is a slight increasing trend of breast cancer in major metropolitan cities compared to cervical cancer ³⁹.

Even in developing countries especially in the metropolitan cities there is a trend in urban women for postponing their pregnancies to a later date. This may be attributable to improved quality of life, education and urbanization. With increased awareness of cervical screening program there is a possibility of discovering very early lesions in young women, who are still anxious to preserve their fertility potential.

Taking in to consideration, all these social, demographic, economic, and health care resources issues, the number of Indian women requiring such a fertility sparing surgery is very low. In the event of discovery of early cervical cancer in very young women interested in fertility, it may be possible to undertake radical trachelectomy in a highly selected group of women with purely exophytic squamous lesions so that during surgery a portion of the upper cervix at the internal os is conserved without compromising on the safety of the margins. Thus decreasing the incidence of cervical incompetence with a higher live birth rate, a lower prematurity rate, and fewer complications in posttrachelectomy pregnancies may be possible. This important information needs to be kept in mind while undertaking radical trachelectomy in the Indian subcontinent.

Conclusion

Radical trachelectomy has emerged as a new surgical technique which fulfils the needs of radicality along with the possibility of preserving childbearing capacity in a selected group of women with early cervical cancer. Available data from case series have shown good oncological outcomes similar to radical hysterectomy. Pregnancies reasonably follow radical trachelectomy resulting in live births and healthy babies, but are associated with a significant incidence of miscarriage and premature labor. It has to be stressed that these techniques need special training, adequate facilities, and good infrastructure. Proper counseling of women is mandatory. This procedure is undertaken only after women clearly understand that this is not the standard treatment at present. Good followup is required to know more about long term complications.

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