

# Preoperative work-up of early cervical cancer (Stages Ib-IIa)

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## Summary

**Objective:** To determine the effectiveness of preoperative investigations in early cervical cancer.

**Materials:** We retrospectively reviewed the medical records of 309 patients with previously untreated early cervical carcinoma who completed pretreatment evaluation at "St. Savas" Cancer Hospital of Athens and "Metaxas" Memorial Hospital of Peireas between January 1986 and September 1, 2000. Ages ranged from 18-77 years old with a mean age of 48 and S.D. of 12.25. FIGO staging was Ib (200 pts.), IIa (105 pts.), IV (4 pts.). Histologic type was squamous (267 pts.), adenoid (35 pts.), adenosquamous (7 pts.). The patients were clinically examined and routinely evaluated with blood work-up, chest X-ray, IVP, abdominal CT scan, barium enema, sigmoidoscopy, cystoscopy, and/or urine cytology. Patients with early stage cervical carcinoma were treated with Wertheim-Meigs radical hysterectomy and pelvic lymphadenectomy, while those with advanced stage cervical carcinoma were treated with radiotherapy and chemotherapy.

**Results:** In urinary tract investigation, CT showed a sensitivity of 100% and a specificity of 99.67%. In gastrointestinal tract investigation CT showed a sensitivity of 50% and a specificity of 99.67%. When we compared the histologic findings of the pelvic lymph nodes that were extracted in surgically treated patients with the preoperative CT findings, we found that CT had a sensitivity of 63.33% and a specificity of 88.57%.

**Conclusion:** In our series of patients with early stage cervical carcinoma, imaging and endoscopic tests added limited information over pelvic examination and altered in four cases (1.29%) the choice of the appropriate treatment modality. CT scans proved adequate in this series of patients in the evaluation of the bladder and colon. All other tests could have been performed only when CT was suspicious of invasion. Moreover, CT served as a baseline examination for future comparative studies in the follow-up of patients.

**Key words:** Early cervical carcinoma; Preoperative work-up.

## Introduction

Cervical cancer is one of the most common gynaecologic malignancies. Accurate staging is crucial for the proper treatment and prognosis of cervical cancer. In order to accomplish this, patients usually have to undergo a number of investigations approved by FIGO [1]. In the last decades CT scans and MRI have also been tested, but not incorporated in the FIGO recommendations. Although staging and proper treatment should be our main goal, patient compliance and stress should also be considered when they undergo a good number of invasive procedures. *The purpose* of this study was to determine the clinical utility of performing cystoscopy and/or urine cytology, barium enema and/or sigmoidoscopy in patients with early cervical cancer who have had a previous abdominopelvic CT scan.

## Patients and Methods

Between January 1986 and September 2000, 309 patients with early cervical cancer were evaluated and treated at "St. Savas" Cancer Hospital of Athens and "Metaxas" Memorial Hospital of Peireas, Greece.

The medical records and the pretreatment investigations were reviewed in all cases. Patients who had neoadjuvant chemotherapy and radiotherapy were excluded from the study.

Ages ranged from 18-77 years old, the mean age and the standard deviation were 48 and 12.25, respectively.

The patients were staged according to the FIGO staging classification criteria for cervical cancer with clinical examination, chest X-ray, full blood count, renal function tests, liver function tests, cystoscopy and/or urine cytology, intravenous pyelography (IVP), barium enema (BE) and/or sigmoidoscopy.

All of the 309 patients had abdominal CT which was performed, within one week before their treatment, after per OS contrast medium administration, with TOSHIBA WHOLE BODY X-RAA CT SCANNER (MODEL TS x-002A), using 10-mm collimation thickness and a 10-mm table movement. Images were evaluated for cervical-uterine size, parametrial and sidewall tumor spread, pelvic and inguinal lymph node metastases, abdominal organ status, including possible hydronephrosis. CT scans were interpreted by experienced radiologists.

Patients were treated with Wertheim-Meigs abdominal radical hysterectomy and bilateral pelvic lymphadenectomy, carried out by a gynecologist oncologist. All pathology was reviewed by an experienced oncology pathologist. Patients with stages that proved to be more advanced after the completion of pretreatment evaluation were treated by radiotherapy and chemotherapy.

Histologic examination revealed that 267 patients had squamous cervical carcinoma, 35 patients had adenoid and seven had adenosquamous carcinoma.

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*Urinary tract investigation*

The urinary tract was evaluated with renal function blood tests in all patients. Additionally, in 309 it was evaluated with CT and/or IVP and/or urine cytology and/or cystoscopy. IVP was performed on 303 patients with no known dye allergic reaction. In any case of suspected allergy steroid injections, 12 hours apart, were administered before the procedure.

- We considered as positive
- 1) hydronephrosis
  - 2) non-functioning kidney
  - 3) imaging features suggesting bladder invasion.

*Gastrointestinal tract investigation*

The gastrointestinal tract was evaluated with CT and sigmoidoscopy in 186 patients and with CT and BE in 121 patients.

Patients were prepared with a light diet and enema the day before the barium enema or the sigmoidoscopy.

*Lymph node and parametrial evaluation*

- As CT positive findings we considered:
- 1) lymph nodes > 1 cm
  - 2) findings of parametrial induration, and
  - 3) loss of fat planes.

This was a retrospective study and statistical analysis would have been of limited value. Furthermore we could not perform a X<sup>2</sup> test to compare CT findings with those of the other examinations, because of the low number of false negative and false positive tests.

**Results**

Blood work-up was within normal range in all patients. Chest X-rays were normal, except for one case with a calcified right pulmonary apex, which was considered as an old tuberculosis infection.

In the urinary tract investigation CT was true negative in 305 patients and true positive in three patients showing a sensitivity of 100% and specificity of 99.67% (Table 1). CT was false positive for bladder involvement in one case of cervical cancer Stage IIa where there was small left parametrial tumor invasion.

Regarding the colon investigation CT was true negative in 304 patients (specificity 99.67%) and true positive in one patient (confirmed with colonoscopy, biopsy and histologic examination). CT was false negative in one (sensitivity 50%) of the two cases of colon invasion (Table 2).

In one case sigmoidoscopy and biopsy revealed dysplastic polyps, while CT was negative for tumor colon invasion. The patient had a family history of colon cancer and she was referred to the gastroenterologists after the completion of her treatment for cervical cancer.

Table 1. — *Urinary tract investigation.*

No. of patients	CT	Cystoscopy and/or Urine Cytology	IVP	Statistics
TN: 290]	—	—	—	Sensitivity: 100% Specificity: 99.67%
TN: 9] 305	—	—	—	
TN: 6]	—	—	—	
FP: 1	+	—	—	
TP: 3	+	+	+	

Table 2. — *Gastrointestinal tract investigation.*

No. of patients	CT	Sigmoidoscopy	Barium enema
TN: 121]	—	—	Sensitivity: 50% Specificity: 99.67%
] 304			
TN: 183]	—	—	
FN: 1	—	+	
TP: 1	+	+	—
FP: 1	+	—	

Table 3. — *Lymph-node status.*

No. of patients	CT	Histology	Statistics
TN: 38	+	+	Sensitivity: 63.33%
FP: 28	+	—	Specificity: 88.57%
TN: 217	—	—	
FN: 22	—	+	

CT was false positive for colon involvement in one case where there was parametrial tumor invasion bilaterally.

When we compared the histologic findings of the lymph nodes extracted in the surgically treated patients with the preoperative CT findings, we found that CT had a sensitivity of 63.33% and a specificity of 88.57% in the evaluation of pelvic nodes (Table 3).

Seven of the 28 false positive cases were due to inflamed, enlarged pelvic lymph nodes noted in the operation with no evidence of disease in pathology.

*Benign findings*

CT detected benign findings such as ovarian cysts, fibroids, gallbladder stones, liver cysts-adenomas, adrenal adenomas, colon diverticulosis, renal cysts, stones, and congenital malformations. Most of them were confirmed at surgery. Adrenal adenomas were also evaluated with blood work-up.

**Discussion**

Careful clinical examination should be performed in all cases of cervical cancer for accurate staging. The following examinations are suggested by FIGO: palpation, inspection, colposcopy, endocervical curettage, hysterectomy, cystoscopy, proctoscopy, intravenous urography, and X-ray examination of the lungs and skeleton. Suspected bladder or rectal involvement should be confirmed by biopsy and histologic evidence [1].

Abdominal CT has been widely used as an optional examination in cervical cancer pretreatment evaluation. Our retrospective study of 309 patients with early cervical cancer, emphasizes the usefulness of pre-treatment abdominal CT scan in these cases.

There are several reports and studies about CT imaging and cervical carcinoma but our study concentrates in early Stages Ib-IIa.

Walsh *et al.* [2] in their prospective comparison between clinical and CT staging in primary cervical carcinoma concluded that CT was most valuable in assessing parametrial and sidewall tumor extension, uterine size, endometrial tumor extension, pelvic adenopathy, and adnexal masses, particularly if clinical examination, under general anaesthesia or not, is not conclusive for the above.

### Urinary tract investigation

Hydronephrosis, a non-functioning kidney demonstrated by IVP, can be interpreted as more advanced stage disease. Bladder mucosa invasion confirmed by cystoscopy and biopsy upstaged cervical cancer. In our series of patients CT detected three out of three patients with bladder invasion (sensitivity 100%) and was false positive only in one case (specificity 99.67%). Additionally, CT agreed with IVP in all except for the above false positive case. Sundborg *et al.* reviewed charts of 49 patients with cervical cancer FIGO Stage II or greater, who underwent both cystoscopy and CT scan before treatment. Similar to our findings they concluded that the utility of performing cystoscopy to rule out bladder invasion in a patient with no evidence of bladder involvement on CT scan is low and might not be necessary [3].

The colon was investigated with barium enema and/or sigmoidoscopy. CT showed a specificity of 99.67% (was true negative in 304 patients) and a sensitivity of 50% (detected 1 of the 2 cases of colon invasion). This false negative case was clinical Stage IIa, with tumor histological size more than 4 cm. There was no evidence of lymph node or viscera metastasis in the further work up and operative treatment.

Montana *et al.* [4] reviewed the Patterns of Care studies survey data on carcinoma of the cervix conducted on patients in 1978, 1983, and 1988-1989 and they noted that there were no major differences in the laboratory studies but there were significant differences in the procedures and diagnostic radiology tests used for the pre-treatment evaluation of the patients. Cystoscopy and sigmoidoscopy fluctuated in the three surveys. IVP was decreased substantially during the period of the third survey (1988-1989). Abdominopelvic or pelvic computed tomography was obtained with increasing frequency from the first to the second and third survey, respectively.

In our study, nine of the women had bulky cervix (> 4 cm) under clinical examination, but the rest of the investigations did not show any evidence of bladder or colon invasion. In such cases with bulky or clinically evident metastatic cervical cancer, Massad *et al.* suggested that chest X-ray and examination under anaesthesia with cystoscopy are important for accurate staging and treatment, while proctoscopy is rarely useful. CT predicts ureteral obstruction well, and has greater information yield [5].

Clinical examination is one of the most important determinants of the pretreatment investigations in cervical cancer. If it is negative for lateral parametrial disease as it is usually in early stages, anterior and posterior spread of cervical cancer to the bladder and rectum is uncommon. Only 20% of patients with tumor extending to the pelvic sidewall have biopsy-proven bladder invasion [6].

In carcinoma of the cervix uteri, metastasis to the lymph nodes initially involve internal iliac, external iliac, common iliac and obturator nodes before progressing to the paraortic chain. Pelvic nodes are positive at lymphadenectomy in about 25% of the patients staged clinically as Ib or IIa [7].

Table 4. — Staging.

After clinical examination	FIGO staging
Stage Ib: 204 (66.01%)	Stage Ib: 200 (64.72%)
Stage IIa: 105 (33.98%)	Stage IIa: 105 (33.98%)
	Stage IVa: 4 (1.29%)

Extrauterine and lymph-node disease can be suggested, noninvasively, by CT with lymph-node detection > 1.5 cm, parametrial enlargement and loss of fat planes.

The most significant disadvantage of CT is said to be its inability to resolve or detect neoplastic disease within normal-sized lymph nodes and to differentiate metastatic nodes from hyperplastic and fatty nodes. Studies in the literature suggest that CT scan appears to be more accurate in the evaluation of paraaortic lymph-node metastasis but of limited use in the evaluation of pelvic lymph-node metastasis [8].

We concluded that in our series of patients with early cervical cancer, pelvic examination proved to be adequate in 98.71% of the cases (Table 4). Cystoscopy, IVP, sigmoidoscopy, barium enema, added limited information, required longer hospital admissions, and costs. Additionally, patients had extended preparations and experienced more stress in order to have all these investigations. CT proved to be adequate in the evaluation of urinary and gastrointestinal tract. CT also proved to be useful in the follow-up and in the planning of radiation therapy. Considering the fact that bladder and rectal involvement are rare, the rest of the examinations can be requested whenever CT is suspicious of invasion. CT scans cost more than the rest of the investigations but have greater information yield in one single exam.

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