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Case Report

Role of Oncological Radiotherapy and Brachytherapy in the Curative Treatment of Cervical Cancer

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Abstract

Cervical cancer remains a significant global health concern, especially in low-income countries. Radiotherapy, including external beam radiation therapy (EBRT) and brachytherapy, plays a pivotal role in the curative treatment of cervical cancer across various stages. This review outlines the epidemiology, diagnosis, staging, and treatment modalities for cervical cancer, emphasizing the efficacy and role of combined chemoradiotherapy and brachytherapy. The document includes a detailed clinical case, highlighting outcomes and management strategies. The integration of radiotherapy into a multidisciplinary approach has shown improved survival rates and quality of life for patients.

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1. INTRODUCTION

Cervical cancer is the second most common neoplasm in the world in women. The possibility of implementing effective screening has drastically reduced the incidence of this tumor in the most developed countries, creating, however, a significant disparity compared to the poorest countries, in which the highest number of cases and 90% of deaths are recorded. In Italy, cervical cancer is the ninth most common neoplasm in women, with approximately 2,100 new cases per year. Mortality has been decreasing over the last twenty years, while the probability of survival five years after diagnosis has increased in the same period from 63% to 68%. The disease is more frequent among

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women of foreign origin, who emigrated from countries where the screening and vaccination programs that have been in place in Italy since the 1980s are not available.

Carcinoma in situ has a maximum incidence around the age of 25-35, decreasing in subsequent age groups until it is absent after the age of 65. Invasive carcinoma, on the other hand, has a variable incidence in all age groups with a peak incidence between the ages of 40-65.

Both in situ and invasive carcinoma (squamous cell….) are associated with multiple risk factors, such as smoking, a high number of sexual partners, and early onset of sexual activity. Human papilloma virus (HPV) infection plays a key role in the development of the disease and is present in almost all cervical carcinomas (99.7%). The latter are mainly constituted by squamous carcinoma of the cervix (85%) and adenocarcinoma (10-12%)

HPV infection is very widespread (prevalence in the general population exceeding 80%) and is considered a necessary, but not sufficient, condition for the development of neoplasia. In most cases, the body has a natural ability to free itself from the virus (up to 80% within 2 years of first contact). The simultaneous presence of causes such as immunosuppression, other sexually transmitted infections and therapies with estrogen-progestins, however, create conditions favorable to the persistence of the virus, which is the riskiest condition for the development of cervical cancer.

Currently the main screening test for cervical cancer is considered the HPV test, which in most Italian regions has replaced the Pap test. The test searches for viral DNA in cervical cells (obtained by cervical smear). It is performed every 5 years starting from the age of 30-35. In cases of positivity to this test, the Pap test must also be performed, which detects the cellular alterations induced by HPV

In recent years, vaccines have also been developed that can prevent infection from the most dangerous HPV viral strains (3 vaccines are currently available: the bivalent vaccine that protects against HPV strains 16-18, the quadrivalent vaccine that also protects against HPV strains 6-11, and the nonavalent vaccine that adds protection against HPV 31,33,45,52,58). These vaccines have proven to be highly effective in preventing the development of pre-cancerous lesions in the cervix, vulva, vagina, and anus. Since 2007, free administration has been offered to all girls in their twelfth year and, since 2015, also to boys of the same age, both directly in the ASL and in General Medicine surgeries. The diagnosis of cervical cancer is made following the finding of a positive Pap test. Only in the already advanced stages of the disease, the diagnosis is made based on clinical findings and symptoms such as bleeding and/or vaginal discharge, pelvic pain, swelling or pelvic masses.

A positive Pap test is followed by a diagnostic colposcopy with the possibility of performing biopsies and a subsequent histological examination.

Cervical cancer is a neoplasm that tends to grow locally, to invade nearby structures and organs by continuity, and to colonize the lymph nodes of the pelvis and abdomen via the lymphatic system. In the most advanced cases, it can give rise to distant metastases. Once the diagnosis has been made, the disease is staged, that is, its extent is defined, in order to plan the most appropriate treatment.

Staging tests include a gynecological examination and magnetic resonance imaging (MRI) of the pelvis with contrast medium to study the local disease, and computed axial tomography (CT) of the chest and abdomen with contrast medium (or PET-CT with 18-FDG), which is especially useful for assessing the possible metastatic spread of the disease.

Depending on the type and extent of the neoplasm, treatment may involve the use of different modalities, used in combination with each other. For this reason, a multidisciplinary approach to the patient is essential, which includes discussion of the case within a team composed of several specialists involved

Surgery includes a spectrum of increasingly destructive interventions ranging from conization and trachelectomy in intraepithelial or minimally invasive lesions, to radical hysterectomy and pelvic evisceration in more advanced stages of the disease. In most early-stage carcinomas confined to the cervix, the standard intervention is radical hysterectomy combined with pelvic lymphadenectomy, performed through different accesses that may include laparotomy, laparoscopy or, more recently, robotically assisted endoscopic access. The sentinel lymph node technique has recently gained popularity, capable of reducing the incidence of surgical complications.

In carcinomas extending beyond the uterine cervix, treatment options may include:

surgery, followed by adjuvant radiotherapy/radiochemotherapy in the presence of risk factors such as tumor size (>2cm), vascular invasion, stromal infiltration >50%, lymph node positivity, parametrial infiltration, positive surgical margins;

-The association of exclusive chemo-radiotherapy, i.e. for curative purposes,

- Neo-adjuvant chemotherapy followed by surgery.

External radiotherapy on the pelvis is often completed by brachytherapy, a radiation treatment administered intravaginally. In the case of persistent, recurrent or metastatic disease, treatment essentially involves chemotherapy to which, recently, the anti-angiogenic antibody Bevacizumab can be associated, which has been shown to improve its efficacy.

Currently, there is no clear evidence on the modalities and role of surveillance in cervical cancer. The current consensus is based on retrospective analyses, literature reviews, and expert consensus. The clinical-gynecological examination (with annual cytological examination) is the assessment with the best-defined role and should be performed every 3-6 months in the first 2 years in high-risk pathologies (every 6 months in low-risk), every six months in the following 3 years (annually and in low-risk). Second-level diagnostic tests (CT, PET/CT, abdomen-pelvis MRI) are indicated based on clinical judgment and in case of suspected disease recurrence.

Recent years, vaccines have also been developed that can prevent infection from the most dangerous HPV viral strains (3 vaccines are currently available: the bivalent vaccine that protects against

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HPV strains 16-18, the quadrivalent vaccine that also protects against HPV strains 6-11, and the nonavalent vaccine that adds protection against HPV 31,33,45,52,58). These vaccines have proven to be highly effective in preventing the development of pre-cancerous lesions in the cervix, vulva, vagina, and anus. Since 2007, free administration has been offered to all girls in their twelfth year and, since 2015, also to boys of the same age. Generally, the diagnosis of cervical cancer is made following a positive Pap test. Rarely, and only in the already advanced stages of the disease, the diagnosis is made on the basis of clinical findings and symptoms such as bleeding and/or vaginal discharge, pelvic pain, swelling or pelvic masses. A positive Pap test is followed by a diagnostic colposcopy with the possibility of performing biopsies and a subsequent histological examination.

Cervical cancer is a neoplasm that tends to grow locally, to invade nearby structures and organs by continuity, and to colonize the lymph nodes of the pelvis and abdomen via the lymphatic system. In more advanced cases, it can cause distant metastases. Once the diagnosis has been made, the disease is then staged, i.e., its extent is defined, in order to plan the most appropriate treatment.

Staging tests include a gynecological examination and nuclear magnetic resonance imaging (NMR) of the pelvis with contrast medium to study the local disease, and computerized axial tomography (CT) of the chest and abdomen with contrast medium (or PET-CT with 18-FDG), which is especially useful for evaluating the possible metastatic spread of the disease.

Depending on the type and extent of the neoplasm, treatment may involve the use of different modalities, used individually or in combination with each other. For this reason, a multidisciplinary approach to the patient is essential, which includes discussion of the case within a team composed of several specialists involved. Surgery includes a spectrum of increasingly destructive interventions ranging from conization and trachelectomy in intraepithelial or minimally invasive lesions, to radical hysterectomy up to pelvic evisceration interventions in the most advanced stages of the disease. In the majority of early-stage carcinomas, confined to the cervix, the standard intervention is radical hysterectomy associated with pelvic lymphadenectomy, performed through different accesses that may include laparotomy, laparoscopy or, more recently, endoscopic with robotic assistance. The sentinel lymph node technique is recently gaining ground, potentially capable of reducing the incidence of surgical complications.

In carcinomas that extend beyond the uterine cervix, treatment options may include:

- surgery, possibly followed by adjuvant radiotherapy/radiochemotherapy in the presence of risk factors such as tumor size (>2 cm), vascular invasion, stromal infiltration >50%, lymph node positivity, parametrial infiltration, positive surgical margins;
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The follow-up is also aimed at the prevention and treatment of side effects related to the disease (such as any gynecological problems, sexual dysfunction, or lymphedema) and their treatment.

According to a WHO report, cervical cancer is one of the three most common cancers in India and the 2nd most common cancer in women (breast cancer is 1st), accounting for 1.2 cases in 2022. The cervix is the lower, narrow end of the uterus (womb). The cervix connects the uterus to the vagina (birth canal). Cervical cancer is a major health problem for women. Radiation therapy plays a crucial role in the treatment of cervical cancer. It is often used alone or in combination with surgery and/or chemotherapy, depending on the stage and characteristics of the cancer. Radiation therapy targets cancer cells with high-energy rays, damaging their DNA to prevent further growth and division. For cervical cancer, there are two main types of radiation therapy: External Beam Radiation Therapy (EBRT) and Brachytherapy.

External beam radiation therapy (EBRT) and brachytherapy are both integral components in the comprehensive management of cervical cancer, providing complementary benefits and improving treatment outcomes. Here is their combined role:

Primary treatment: EBRT is often used as the primary treatment for cervical cancer, especially in cases where surgery is not feasible or not preferred by the patient. It transmits high-energy X-rays to the pelvic region, targeting the tumor and nearby lymph nodes.

Adjuvant therapy: After surgery, EBRT may be given as an adjuvant therapy to eradicate any remaining tumor cells and reduce the risk of recurrence. It helps improve local control and reduces the likelihood of disease progression

Neoadjuvant therapy: EBRT can be used before surgery (neoadjuvant therapy) to shrink the tumor, making it more amenable to surgical resection. This approach can increase the success rate of surgery and improve long-term outcomes.

Palliative therapy: In advanced or metastatic cervical cancer, external beam radiation therapy can be used as palliative therapy

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to relieve symptoms and improve quality of life by reducing the size of the tumor and relieving associated symptoms.
Localized treatment: Brachytherapy involves placing radioactive sources directly into or near the tumor, delivering a high dose of radiation precisely to the cancerous tissue, while sparing surrounding healthy organs.
EBRT enhancement: Brachytherapy is often used as a boost after EBRT, further intensifying the radiation dose to the tumor site. This approach increases the effectiveness of treatment and improves local control of the disease.

High dose rate (HDR) vs. low dose rate (LDR)
Brachytherapy can be administered in two main forms: HDR and LDR. HDR brachytherapy delivers a high dose of radiation over a short period, typically in multiple sessions over a few days, while LDR brachytherapy delivers a continuous low dose of radiation over a longer period, often requiring hospitalization. Both approaches are effective, with HDR brachytherapy being more commonly used due to its convenience and shorter treatment duration.

Improves disease control: By delivering high doses of radiation directly to the tumor, brachytherapy significantly improves local disease control and reduces the risk of recurrence

Organ Preservation: Brachytherapy minimizes radiation exposure to adjacent healthy tissue, preserving organ function and reducing the likelihood of radiation-related complications.

Overall Survival Benefit: Studies have shown that adding brachytherapy to external beam radiation therapy (EBRT) significantly improves overall survival and disease-free survival rates in patients with cervical cancer, making it an essential component of treatment.

Combined Modalities Treatment
Chemoradiotherapy: EBRT and brachytherapy are often combined with chemotherapy in a multimodality approach known as chemoradiotherapy. This comprehensive treatment strategy has been shown to significantly improve survival rates and disease control compared to radiation or chemotherapy alone. By combining EBRT and brachytherapy, Radiation Oncologists can target the tumor from both external and internal sources, delivering powerful radiation therapy while minimizing damage to surrounding healthy tissue. This comprehensive approach improves treatment outcomes, enhances local disease control, and contributes to improved overall survival rates for patients with cervical cancer.
Potential side effects
Like any medical treatment, radiotherapy can cause side effects.

These may include:
-tiredness
- Skin irritation in the treated area
- Diarrhea
- Increased frequency or burning during urination
-Sexual dysfunction

These side effects are temporary and can be managed with medications and supportive care in the Outpatient and RT Department.

CLINICAL CASE

Born from eutopic birth, menarche at 14 years, subsequent cycles are regular in quantity and duration. Menopause at 36 years. Denies use of E/P.
6 PARA, 4 Children, 2 IVG
Bowel: regular,
Diuresis: Regular
Smoking: denies
Therapy: Omeprazole
Allergies: denies

Remote Pathological History
— Remember the CEI.
— Surgery for varicose veins.
— Duodenal ulcer.

Recent Pathological History
V.A.C. referring physician
December metrorrhagia for which she was admitted to the ER and performed the necessary tests.
ECO TV: uterus with markedly inhomogeneous echostructure with strong cervical inhomogeneity and endocavitary fluid collection. Highly suspicious for cervical neoplasia.
Biopsy of the cervix (09/02): fragments of invasive squamous cell carcinoma with a medium degree of differentiation.
PET CT (12.02.): Intense accumulation of FDG in the pelvic cavity in correspondence with a voluminous solid swelling (SUV max 11.7), dm 58x44mm, recognizable in the recto-vesical space, in the median location and with possible initial extension to the vaginal fornix. Upper hypocaptating image in correspondence with the uterine fundus, site of hypodense collection.
Pelvic MRI (18.02.): Large inhomogeneous expansive formation with irregular margins located at the level of the cervix (max. d 60x40x50mm), slightly hyperdense in T2 with signal restriction in DWI sequences and inhomogeneous post-contrast enhancement. Endometrial cavity markedly distended by fluid with inhomogeneous signal. The neoformation has irregular contours on the lateral side, the hypointense line of the cervical stroma is not recognized as if the parameters were involved, furthermore, probable extension to the upper third of the vagina. some lymphadenopathies (short axis 5-7mm) in the iliac area bilaterally. Minimal fluid layer in the pelvic cavity.

STAGE II b according to FIGO
Clinical Diary
A 57-year-old patient, affected by squamous cell carcinoma of the uterine cervix (G2), stage II B (FIGO).
Patient in good clinical condition. PS (ECOG): 0. Pain NRS 0/10.
Reports moderate metrorrhagia every 2-3 days.

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Gynecological visit: external genitalia NDP. neoformation that occupies the cervix, anterior lip up to half anterior wall of the vagina, moderate bleeding.
Blood tests were requested.
Performed CTG, and blood tests today.
Interview with Oncologist, appointment set to start CDDP on 04.21.16. After the first RT session, the patient will have to go to the oncology DH to collect the appointment sheet.
Starts RT treatment today. The patient is in good general condition. PS (ECOG): :0. Pain NRS 0/10. Reports mild metrorrhagia.
EE (01.04.16): WBC 9.99, RBC 4.2, HB 11.5, PLT 265. Blood sugar 89, Creatinuria 0.80. Creat Cl 113.93.
Urine test (01.04.16): Erythrocytes 34, Leukocytes 302.
Kistinox f and Ivucran are delivered. Dietary supplement.
Urine culture with antibiogram is requested
Requests delivered
28.04 Patient in fair general condition. PS (ECOG): 0. cramp-like abdominal pain NRS 5/10. Regular bowel movements, normal stools. Reports yellowish vaginal secretions on Sunday. On 27.04 reports pink secretions likely vaginal. Reports nausea. Anorexia.
EE (27.04.16): WBC 6.65, Linf 1.06, Neutr 5.13, RBC 4.2, HB 11.7, PLT 276, Glycemia 100, Azotemia 18, Creat 0.87. Sterile urine culture at 48 hours.
EO: non-purulent sero-haematic secretions, free vagina and cervix with restored anatomy is appreciated.
Sancuso patches are prescribed 1/week CDDP II
PC 60kg
Omeprazole 20mg
Plasil 10mg, 2vv
Sancuso
Patient in good general condition. PS (ECOG): 0. Pain N
RS 0/10. Improvement of nausea, the patient can eat without difficulty since taking Sancuso. Regular bowel movements. Physiological diuresis.
EE (04.05.16) performed.

Patient in good condition PS (Ecog): 0/1. Reports diarrhea yesterday (>5 discharges) and three discharges since this morning, for which he is taking Imodium cp.
Reports of persistent nausea G1/G2.
Adds Deltacortene 25 mg to the current therapy, 1/2 cpr after breakfast and 1/2 cpr after lunch.

Good general condition. No more diarrhea after the three discharges yesterday, nor nausea.
Performs RT 13/28 fr.
Perform RT 15/28fr
Patient is in fair general condition. PS (ECOG): 0. Pain NRS 0/10.
EE (12.05.16): WBC 4.01, Neutr 2.87, Linf 0.73, RBC 3.6, HB 10, PLT 148. Azotemia 25, Creat 0.89.

Perform RT 20/28fr
Patient in good clinical condition. No nausea, good appetite. Regular bowel movements, normal stools. PS (ECOG): 0. Pain NRS 0/10.
- EE (18.05.16): WBC 3.71, Neutr 2.66, Linf 0.75 RBC 3.6, HB 10.4, PLT 145, creatine 0.87, Sodiemia 138, Potassiemia 5.20 (>).

Performs RT.
The patient reports that since using Sancuso tts and plasil she is able to eat better and manage nausea better. Regular bowel movements, and physiological diuresis.Performs HT.
Perform RT.
Patient in fair clinical conditions. PS (ECOG): 0. Pain NRS 0/10. Nausea G1, denies vomiting. sometimes reports loose stools, mild abdominal cramps. No skin erythema.

Radiotherapy treatment ends today
EE (06.26.16): WBC 1.72, Neutr 1.29, Linf 0.31, RBC 3.4, HB 9.8. Glycemia 90, Azotemia 23, creatine 1.02, AST 15, ALT 13.
Mrs. A.G., 65 years old, affected by moderately differentiated squamous cell carcinoma of the uterine cervix stage II B (FIGO). performed at our U.O.C. a concomitant chemotherapy treatment (CDDP 40mg/mq2 for VI cycles) and radiotherapy from 04.19. to 06.01. with IMRT-SIB technique and 6 MV X-ray photons on the following focus and with the following modalities:
- Pelvis: 2.2 Gy in 28 daily fractions for a total dose of 61.6 Gy prescribed at the 95% isodose.

During the treatment the patient presented: nausea G2, vomiting G1 for which she underwent medical therapy with omeprazole, metoclopramide as needed and Sancuso patch. The treatment did not undergo interruptions.
At the end of the treatment, the patient presents good general conditions, Ps (Ecog): 0. Pain NRS 0/10. Regular bowel movements, physiological diuresis.
Scheduled MRI on 06.09, and PET Tc on 06.15.

The patient must present himself/herself to our clinic to undergo the first fraction of Brachytherapy, bringing with him/her a complete blood count with formula, urine test and urine culture.
he patient today undergoes a PET CT Pelvis.
Brings to view:
- Pelvic MRI 09/06/: normal-sized uterus, thin endometrium. Clear reduction of the known cervical formation which currently presents modest hyperintensity in T2 and dimensions of 16x16mm. poor enhancement after contrast medium. Reduced size of the iliac lymph nodes bilaterally compared to the previous check.
- Complete blood count (07.06.16): WBC 1.17, Neutr 0.68, Linf 0.31, RBc 3.1, HB 8.7, PLT 128, glycemia 97, Azotemia 24, Creat 1.00, GGT 12. Urine test: leukocytes 39. Negative urine culture
The urgent complete blood count is required.

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Patient in fair general condition. Ps (eCOG): 0. Nausea G2-G3. Today he has not vomited.

Bring in vision:
- EE (16.06.: WBC 2.78, Neutr 1.54, Linf 0.81, RBC 3.2, HB 9.1, PLT 241, Glycemia 98, Azotemia 20, Creat 1.02, GOT 19, GPT 11.
BRT scheduled for 07.07 - 11.07 - 14.07.
Pz in good general conditions PS (Ecog) 0. denies significant disorders, no dysuria, no strnguria, no episodes of vomiting.
EE of 4.7: Urine culture negative, GR 3.2, HgB 9.7, PLT 198, GB 6.38
PET CT of 20.6: RC
Ciproxin 500 mg is prescribed, 1 x 2/day, Cicatridina ovules

Performs II fraction of endouterine HDR BT, dose delivered 7 Gy.
Dose reached 14 Gy.
Performs III and last fraction of BT, total dose 21 Gy.

Pz aged 65, affected by squamous cell carcinoma of the uterine cervix, underwent endouterine HDR brachytherapy treatment, at our U.O.C., for a total dose of 21 Gy delivered in 3 fractions according to the following modalities:
I fraction: 7/07/: I fraction of 7 Gy
II fraction: 11/07/: II fraction of 7 Gy
III fraction: 14/7/: III fraction of 7 Gy
The tolerance to the treatment was good.
The patient will return for a follow-up outpatient visit, at our UOC, on August 2, bringing a complete blood count, urine culture with possible antibiogram.
They are prescribed: Cicatridina ovules (1 in the evening for 30 days), Normovagin ready lavage (for 7 days, then 1 per week).
At 3 months, a pelvic MRI with contrast medium and PET CT are requested.
Patient in good general condition. Denies losses.
Brings in:
- EE (26.07.2016) GB 6.15, GR 3.0, Hb 9.9, Plt 176, Urine culture negative.
Next check-up at the end of October with pelvic MRI with contrast medium, PET/CT and gynecological video.
gynecological visit: free vagina, cervix deviated left, mobile and soft.

The patient in good general condition. PS (eCOG): 0. Pain NRS 0/10. PC 62 Kg, good appetite. Paresthesia persists in the extremities of the lower limbs (post CHT). Physiological diuresis, regular bowel movements.
The patient reports productive secretions and cough.
Bring in vision:
- EE 27.09: WBC 5.29, Neutr 4.03, Linf 0.92, RBC 3.9, HB 1.8, PLT 169, glycemia 94, BUN 28, creatine 1.02, CEA 5.92 (vn <3), Ca 125: 19.4
- X-ray mammography (04.10.): negative.
- Pap Test (19.09.): negative.
- MRI pelvis (29.09.): no signs of loco-regional recurrence, no lymphadenopathy. Minimal effusion layer in the pelvis.
- PET FDG 20.10: area of increased uptake that projects anteriorly to the thoracic aorta near the left main bronchus where a faint hyperdensity is appreciated. (recheck via CT).
Patient is in good general condition. PS(ECOG): 0. Pain Nrs 0/10. Reports moderate asthenia and dyspnea.

Brings in vision:
-PET CT 04.01.2017: focal area remains near the left main bronchus SUV max 3.37 vs 2.66. On CT it corresponds to a faintly hyperdense pseudonodular area (lymph node?).
-CT CHEST 02.01: Not in vision, report to oncology.
-EE 17.12: CEA 5.93 Ca 125 16.6. WBC 6.14 RBC 3.8 Hb 11.8 Plt 176.
-PAP TEST 19.12: Negative.

Next oncology video to be scheduled.
Case will be discussed at Glam

Case discussed at GLAM.
The patient will be called for a PET CT scan in April and a RT visit in May.
PET CT 10/4: the presence of a focal area of increased uptake with substantially unchanged uptake indices (SUV max 3.44 vs 3.37) already reported anterior to the thoracic aorta near the left main bronchus is confirmed. Useful monitoring.

Patient in good general condition. PS(ECOG): 0. Pain nrs 0/10. Denies any noteworthy disorders.

Bring in vision:
-7/8/2017: Wbc 4.5 rbc 3.79 hb 11.8 plt 169. Ca 125 17
-PET TC 31/8/2017: Compared with the similar one of April 2017, the exam shows substantial stability of the glyco-metabolic picture, with persistence of the focal increase in uptake (SUV Max 3.82 vs 3.44) previously reported anterior to the thoracic aorta near the left main bronchus.
-Gynecological ultrasound 11/10/2017: Uterus of reduced dimensions and inhomogeneous echostructure due to fibromatosis. Endometrium maximum thickness 2 mm. Nothing in the adnexa, the rest is neative.
-Pap test 17/10/2017: neg

PET TC is scheduled for 15/12/2017.
Gynecological oncology visit scheduled on 01/26/2018 with EE, PET, TC

Patient in good general condition, PS ECOG 0, pain NRS 0/10. Denies any noteworthy disorders.
He underwent an oncological videotape on 1/26/18. Next check-up scheduled for July with PET.

Brings to view:
- EE (12/2/17): GR 4, Hb 12.4, GB 4.72, PLT 159
Glyc 95, Azot 19, Creat 0.98

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CEA 5.71 CA125 16.8 CA15.3 9.1
- PET CT (12/15/17): confirmation of modest focal uptake areola reported at the level of the left pulmonary hilum, anterior to the thoracic aorta near the main bronchus (SUV max 3.5 vs 3.8).
- PAP TEST (10.10.17): negative
- ECO TV (11.10.17): small uterus with inhomogeneous echostructure due to diffuse fibrosis. Endometrial echoes with linear and thin attitude; max thickness 2 mm.
check in July with mammography, x-ray, PET, and gynecological visit.
MOC and vitd
Pt in good general condition, PS ECOG 0, denies new onset disorders, denies vaginal mucosal dryness
Oncological video on 7/27/18, next check-up in March 2019 with abdomen-pelvis MRI and MT
Gynecological video: vagina 5-6cm long with BT results. Portio not recognisable, soft thin and linear endometrium, no swelling in the adnexal area.
PAP test in progress of reporting

Brings into view:
EE (9/6/18): GR 4, Hb 12.6, GB 4.88, PLT 182
glycemia 86, creatinine 1.01, vitamin D 18.8 (prescribed as baseline)
CEA 6.67, ca 125 17.6, ca 15.3 9
PET CT (6/7): overlapping with the December 2017 check-up (area in the left lung hilar area, anterior to the thoracic aorta near the main bronchus, SUV max 3.5
bilateral mammography (26/6). negative
MOC (15/6): lumbar osteoporosis and femoral osteopenia

Next check-up in March with EE, CT TB contrast medium and geriatric visit and tests requested by oncologists. In consideration of the Stability finding on PET CT, narrow FUP is decided. Patient in good general condition, PS(ECOG): 0, denies any complaints. Oncological video performed: next check-up in September with BIL mammography, gynecological video (pap test and TV echo) and chest CT.

Brings to view:
- Abdominal MRI of 02/26: negative
- CTTB of 12/18: CHEST: millimetric nodular image in the posterior segment of the LSS in the para mediastinal location of about 4mm not pitiable. Some lymph nodes in the anterior mediastinal location (the largest of about 8mm) and in the paratracheal location (the largest of about 9mm). ABDOMEN: negative. SKULL: negative
- Geriatric video on 2/6: Lodotra is prescribed for 1 month and physiatric visit.
-EE of 02/16/19: VIT D 31.2, CEA 5.73, Ca 125 19, Ca 15-3 9.8, GR 4.4, HB 13.5, PLT 243, GB 5.54.
Returns for check-up in September with the tests requested by oncology colleagues.
Patient in good general condition, PS(ECOG): 0, denies any complaints. He underwent an oncological examination on 09/06/19: PET-CT request.

Brings for viewing:
-HRCT (07/30): no focal pleural parenchymal lesions with an active character are appreciated. Millimetric layer of pericardial effusion. Presence of lymph nodes with sub and pericentimetric short axis in the mediastinal stations; lymph nodes with reactive-type aspects in the axillary area bilaterally. -Mammography bil (25.07): NEG
-MT (20.07.): CEA 7.49, Ca 12517
-pap test (18.06.): neg

Return to the control together with the oncology visit.
Patient in good general condition, PS(ECOG): 0, denies any complaints. He underwent an oncological examination on 06.09.19: PET-CT request.

Brings to view:
-HRCT (30.07): no focal pleuroparenchymal lesions with an active character are appreciated. Millimetric layer of pericardial effusion. Presence of lymph nodes with sub and pericentimetric short axis in the mediastinal stations; lymph nodes with reactive-type aspects in the axillary area bilaterally.
-Mammography bil (25.07): NEG
-MT (20.07.): CEA 7.49, Ca 12517
-pap test (18.06.): neg

Returns for check-up together with an oncological examination.
Patient in good general condition, PS(ECOG): 0, denies any complaints.
Last oncological examination on 22.11.

Bring in vision:
-MT 13.11: CEA 5.4 CA 125 10.8
-PET\TC 11.11: Persistence of the previously reported findings, of likely lymph node relevance, in the left hilar-parahilar lung region which, at today's check, are characterized by an increase in the uptake gradient; in particular, the finding located anterior to the thoracic aorta near the main bronchus, shows higher uptake indices (SUV max equal to 6.37 vs 3.5). Mild moderate uptake in correspondence with further lymphadenopathies located in the right paratracheal area and the ipsilateral hilar-para hilar lung region. Symmetric activity is also observed in both adrenal glands of likely functional significance.
Thoracic surgery / Interventionalists video requested
Telephone contact with daughter. She informs us of date for CT-Chest with contrast medium on 03/12.
Case discussed at a multidisciplinary meeting. In consideration of the non-conclusive CT report, a diagnostic bronchoscopy is scheduled by the case manager.
In consideration of the CT chest of 03/12, the pulmonologists informed us that they do not consider it useful or feasible at the moment to perform the procedure given the paucity of the report. Therefore, the patient will be contacted for a new CT Chest with contrast medium for re-evaluation after 3 months.

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Update
The patient comes to visit.
The patient in good general condition. The patient is informed again that she will be called back for a new CT chest with contrast medium.
A blood count is prescribed, and the patient returns for the visit after having performed the CT.

FUP
Pz in good general condition, denies any noteworthy disorders
CHEST CT 10.03.: exam compared with the previous one of 3.12. unchanged mediastinal lymph nodes with sub and pericentimetric short axis in the left paraaortic and right paratracheal stations and in the axillary stations bilaterally. no alterations in the density of the pulmonary parenchyma bilaterally. ectatic common pulmonary trunk 41 mm. no pleural and/or pericardial effusion

EE 6.03.20 GR 4.31 hb 12.9 GB 4.06 PLT 206 creatinine 1.05

No longer performed oncological visit, which is also requested in view of the suspension of the FUP RT.
6-month control with PAP test and fdg PET.
Patient in good general condition

Patient scheduled for oncology visit on 11/27.

FDG PET 11/21

Compared to a similar control in November, a substantial stability of the glyco-metabolic picture is observed; in particular, the findings of focal uptake are confirmed, likely of lymph node relevance, recognizable in the left pulmonary hilum [current SUVmax 4.9 vs 5.1] as well as along the anterior profile of the thoracic aorta near the main bronchus, always on the left [SUVmax 5.1 vs 6.3]: these findings appear to be attributable, in the first hypothesis, to a condition of chronic inflammation, for which long-term monitoring is recommended as a precaution. Limited to the resolving power of the method (about 5 mm) and to the forms with low metabolic activity, no images of pathological hypercaptation of the tracer are observed in the remaining body regions examined. Conclusions: persistence of hypercaptating focalities in the left hilomediastinal area.
10.13.Gynecological visit: PAP test: negative.
Transvaginal Ecog scheduled
10.27.Mammography: negative

The patient will continue the checks with her oncology colleagues.

Clinical history: in February clinical-instrumental confirmation of cervical neoplasia [invasive squamous cell carcinoma - G2] with PET-FDG and staging MRI indicative of loco-regional disease [Stage IIb]; followed by combined chemotherapy [CDDP x6] and radiotherapy [61.6 Gy on the pelvis] concluded in June of the same year with subsequent consolidation brachytherapy [21 Gy]; at the re-evaluation PET, glyco-metabolic CR; clinical-instrumental follow-up; pelvic MRI in February negative for disease recurrence; PET in November: "persistence of the known alterations in the left hilar-para hilar region of the lung, which, at today's check-up, show an increase in glucose metabolism"; Chest CT in March: "substantially unchanged (compared to the previous December) the mediastinal lymph nodes with sub-/ and peri-centimetric short axis in the left para-aortic and right para-tracheal stations and in the axillary stations bilaterally. No alterations in the density of the lung parenchyma"; in October mammography and PAP test negative for pathological findings; comorbidities: in May endoscopic finding of duodenal ulcer; ectasia of the common pulmonary trunk [41 mm]
reported widespread osteoarthritis for which the patient is taking corticosteroid therapy. Diagnostic question: reassessment of a disease with high glucose metabolism. Blood glucose at the time of 18F-FDG administration: 89 mg/dl Isotope: 18-F Activity administered: 225 MBq The test was performed on an empty stomach, with PET technique, after intravenous administration of 18F-FDG and with 3D modality. Images of the distribution of the cell viability tracer from the orbit-meatal plane to the upper third of the femurs were acquired. Multi-planar tomographic sections corrected for photon attenuation were reconstructed using the low-dose CT method. The encephalic district cannot be assessed due to the limitations of the method. Compared to a similar control in November 2019, substantial stability of the glycometabolic picture is observed; in particular, the findings of focal uptake, likely of lymph node relevance, are confirmed, recognizable in the left pulmonary hilum [current SUVmax 4.9 vs 5.1] as well as along the anterior profile of the thoracic aorta near the main bronchus, always on the left [SUV max 5.1 vs 6.3]: these findings appear to be attributable, in the first hypothesis, to a condition of chronic inflammation, for which long-term monitoring is recommended as a precaution. Limited to the resolving power of the method (about 5 mm) and to the forms with low metabolic activity, no images of pathological hypercaptation of the tracer are observed in the remaining body regions examined. Conclusions: persistence of hypercaptating focalities in the left hilum-mediastinum. The Specialist Doctor in Training V.A.C

Radiotherapy treatment plan
Combined chemotherapy [CDDP x6] and radiotherapy [61.6 Gy on the pelvis] concluded in June of the same year with subsequent consolidation brachytherapy [21 Gy]; The patient also responds positively to brachytherapy and does not show adverse reactions and specific and non-specific side effects to RT. Pharmacological prevention before and after treatment in addition to frequent specialist visits have contributed to the success of the RT/BRT treatment, bringing the patient back to good control of the cervical oncological disease (squamous cell K) Monitoring continues at 3/6 months to control the progress of the oncological disease.

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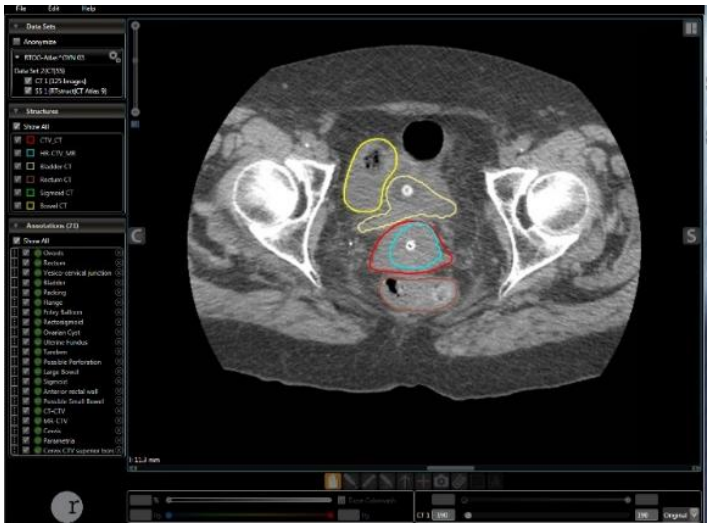

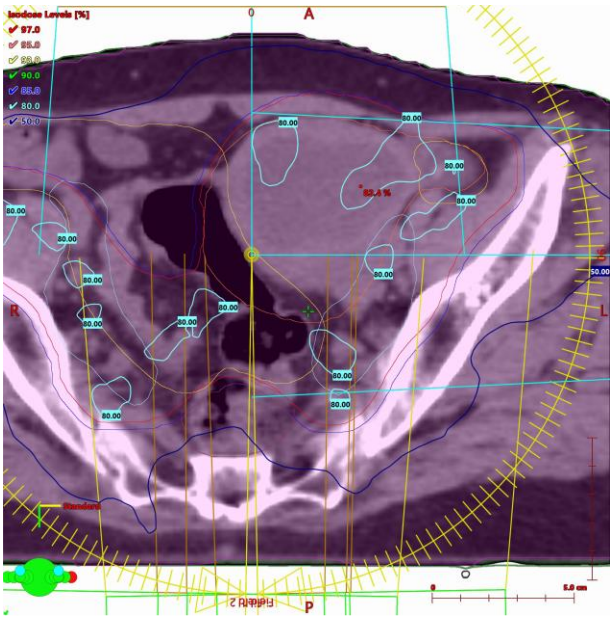

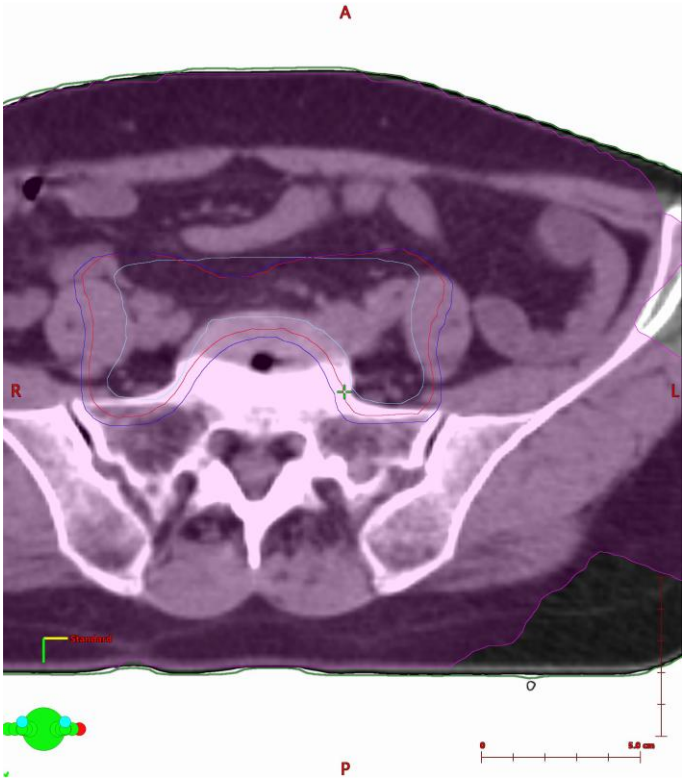

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