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COMORBIDITY

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content

EDITORIAL

Comorbidity

Prof. Dr. Pëllumb PIPERO

Comorbidities are concomitant diseases and may include physical or mental health and may refer to the coexistence of two or more pathologies, which appeared at the same time, or at different times, affecting a system or different systems. Comorbidities have a great effect on the life of patients because the presence of a social disease can lead to an increase in the inability to work, reducing the cost of living, the management of the disease becomes more complex and significantly reduces the productivity of a society.

Within the last decade, the group of co-morbidities has become a growing health problem, as well as the leading causes of death on a global level and will continue to challenge health care professionals in the upcoming years. While previously individuals had a known chronic pathology, currently people live with more than one chronic pathology, known as comorbidity or multimorbidity. The terms comorbidity and multimorbidity are often used interchangeably to refer to co-occurring conditions, however they have an important distinction[1]. While both terms state the occurrence of multiple conditions within the same individual, comorbidity refers to one or more additional conditions in reference to an index condition such as comorbidity in diabetes mellitus. In comparison, multimorbidity describes that no one condition is holding priority over any of the co-occurring conditions[2]. Therefore, the complexity of comorbidity and multimorbidity has brought great challenges to the health care system, health care professionals and the person living with them.

[1] Yogini V Chudasama, Kamlesh Khunti and Melanie J Davies (2021). Clustering of comorbidities. Future Healthcare Journal Vol 8, No 2: e224–229. DOI: 10.7861/fhj.2021-0085

[2] Tugwell Peter, Knottnerus Peter (2019). Multimorbidity and Comorbidity are now separate MESH headings. Journal of Clinical Epidemiology, Vol 105, 6-8. Elsevier.

Clinical studies show that comorbidity is a common phenomenon, the rule rather than the exception in several medical disciplines, and particularly in the elderly. Comorbidity is associated with poorer health outcomes, more complex clinical management, and increased health care costs. Understanding independent risk factors and/or causality, determining underlying mechanisms and clinical implications is challenging, as it is due to multiple factors and patient specifics.

Some of the clinical case studies presented in this issue of Medicus Journal will contribute to better understanding of comorbidity through the approaches selected by medical doctors in their clinical practice, the impact of specific comorbidities and the management of patients' outcome.

A Covid 19 Case Report complicated with respiratory failure and retroperitoneal hematoma

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Abstract

Introduction: *The Covid 19 pandemic confronted us with a series of multidisciplinary pathologies, beginning with the virus and followed by a cascade of SIRS and multiorgan failure. During the treatment therapy of antivirals, anticoagulants, corticosteroids and antibiotics, we also encounter medications' interactions.* ***Method:*** *We described a case report of a 74-year-old man, who during the course of hospitalization had several complications.* ***Results:*** *He developed respiratory failure, delirium, SIRS, as well as retroperitoneal hematoma (HRP) as a complication of anticoagulant therapy. It was followed by hemorrhagic shock, respiratory distress and the patient was submitted under mechanical ventilation with step-by-step resuscitation. The patient made clinical and laboratory improvement by being extubated and thereafter was rehabilitated pulmonary and physically. On the 42nd day of hospitalization the patient was discharged from the hospital. Pulmonary and locomotor rehabilitation of the patient was established 2-3 weeks after hospital discharge.* ***Conclusion:*** *Establishing a retroperitoneal hematoma diagnosis requires clinical intuition. Some signs which can raise an alert for a retroperitoneal hematoma can be hypotension, tachypnea and back and abdominal pain in patients who are under anticoagulant therapy.*

Key Words: *Covid 19, complications, retroperitoneal hematoma*

Introduction

The novel coronavirus epidemic of 2019 (COVID-19) resulted in a global public health emergency[1]. The grown body of literature described Covid-19 as a complex disease. There are several studies describing the complications of Covid-19. We recognize Covid-19 as a viral disease with poly-pathological potential, which can affect all systems and organs of the organism, regardless of physio-pathological mechanisms that are all over the place. In addition to respiratory issues, COVID-19

has been linked to extrapulmonary symptoms and consequences. In patients with critical forms of the disease, SARS-CoV-2 can cause a hypercoagulability situation, which can lead to thrombotic phenomena in a variety of organs (for example, pulmonary embolism)[2] . Consequently, the use of anticoagulant preparations as prophylaxis was seen as a treatment option[3]. Elevated levels of C-reactive protein and pro-inflammatory cytokines (IL-6, tumor necrosis factor-α, IL-8, etc.) determine the mimicry of vasculiitis[5]. There is evidence of *direct viral infection of endothelial* cells which may cause hypercoagulability and diffuse blood clots (disseminated intravascular coagulation [DIC]) and result in "multiple organ injury"[4,6–9]. DIC is known to be associated with platelet and fibrinogen consumption, resulting in an increased risk of bleeding.

Method

We described a case report of a 74-year-old man, who during the course of hospitalization had several complications. Covid 19 was verified in our patient by reverse transcriptase – protein chain reaction (RT-PCR) test on nasopharyngeal swab sample. The patient was admitted to hospital and had no previous history of injuries. We have agreed with the patient on ethical issues and anonymous data. Regarding symptomatology the patient was hospitalized with symptoms of cough, myalgia, asthenia, fever which started 10 days previous to the referral in the hospital and was worsened in the last 2-3 days with difficulty in breathing, during exertion and at rest. The decrease in SO2 was measured with oximeter at home.

On admission the patient refers that he suffers from HTA and was under treatment. On the day of hospitalization the temperature was 37.7^{0}C, tachypnea 22', SO2 – 85% in room air in the lying position and SO2 95% under 7-8l/min O2 support with a nasal mask. In laboratory tests, we noticed increased inflammatory markers (CPR, VES, fibrinogen, ferritin, d dimer). During following days it was observed 1st stage of encephalopathy with signs of delirium. In CT scan of lung were described bilateral ground glass opacities. Therapy was started with a combined antiviral-remedesivir + antibiotic tazocin + anticoagulant clexane 6000Ui x 2 sc, methyl prednisolone 40 mg x 2 iv, haloperidol and deslorazepam for delirium and agitation. In the first week of hospitalisation the need for O2 therapy increased up to 30l/min with High Flow Nasal Mask. At the end of the second week the clinical signs began to improve, there was a decrease in inflammatory markers and the gradual decrease in the need for O2.

At the beginning of the 3rd week, the patient complained of pain in his left leg, had hypotension TA 90/60 mm/Hg and tachypnea - 25/min. Objectively, a hematoma area was observed in the back of the right renal lobe. Abdominal

CT scan was urgently performed, focused in the area where the retroperitoneal hematoma of the left iliopsoas was evident.

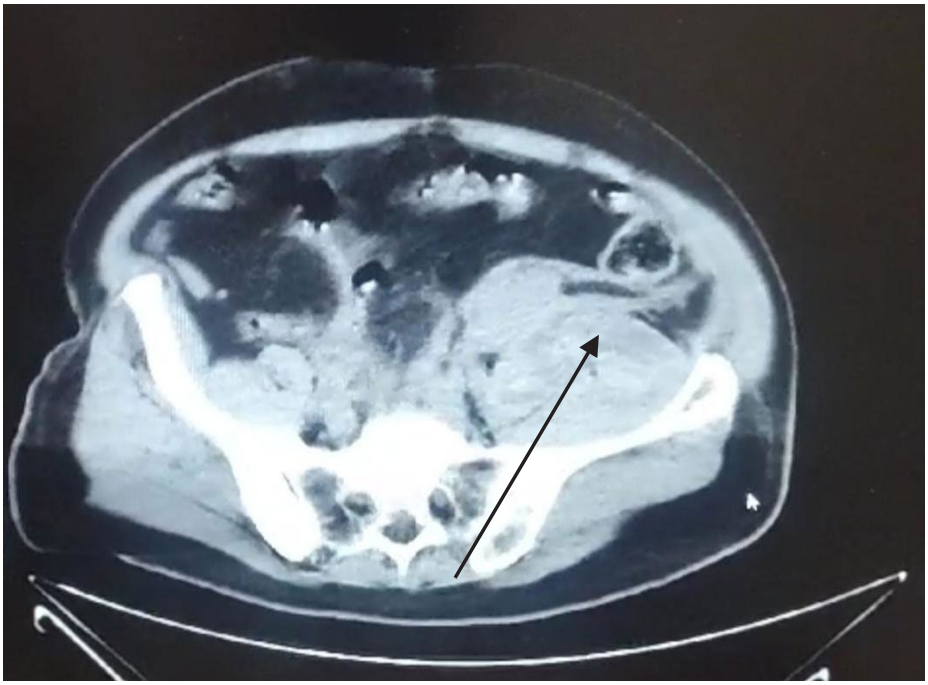
Red Blood Cells and hemoglobin decreased to 2.9 million and 7.2 mg/dl. In these conditions, the patient got transfusion with erythrocyte mass 9fl and 12 fl frozen fresh plazma, anticoagulants were stopped and he was resuscitated with fluids and vasopressors noradrenaline, dopamine, lasix to maintain vital parameters and the renal function.

On the 3rd day of the event, the patient suffered acute respiratory distress - pulmonary edema, for which he was intubated in emergency conditions. After 72 hours the situation improved by gradually lowering FIO2 until extubation. Clinically, there was improvement and stabilization of arterial pressure, in ultrasound HRP withdrawal but with rather low muscle strength and expectorate extraction. The therapy was modified with antibiotics and antifungals, human albumin, pentaglobin, aminoven and enteral nutrition. Fibro-bronchoscopy and bronchial lavage were performed, and at the same time we began physiotherapy and postural drainage.

The course improved after 6 weeks of hospitalization and the patient was discharged at home in better conditions.

FIGURE 1: CT scan of the lungs: Opacities ground glass

FIGURE 2: Retroperitoneal hematoma



Discussion

Covid-19 may have a tendency to form vasal thrombosis affecting various organs. They can be unique, of different dimensions, but also in the form of microthrombotic vasculitis, mainly pulmonary. Most often this phenomenon appears in the venous system, but it also affects the arteria, appearing with different clinical syndromes.

The extrapulmonary manifestations of COVID-19 are highlighted along with the proposed pathophysiologic mechanisms and management considerations for each system[10.] Patients may be predisposed to venous thrombosis by direct effects, Covid-19 or tertiary (potent inflammatory response); critical disease; traditional risk factors such as age, D-dimer supplementation; cytokonic storm; hypoxic damages; endothelial dysfunction; Hypercoagulation and/or increased platelet activity.

After recognizing the possibility of the involvement of SARS-COV2 in the occurrence of thrombotic complications such as microvascular thrombosis, venous thromboembolic disease, and stroke, anticoagulant therapy has commonly been used to prevent or treat COVID-19 patients[11]. Several guidelines recommend anticoagulants such as aspirin, enoxaparin and unfractionated heparin.

Establishing a retroperitoneal hematoma diagnosis requires a clinical intuition because the signs and symptoms in the early stages are not visible until a significant amount of blood flows. The clinical symptoms that make you suspect are progressive development of arm, abdominal and back pain or hemodynamic alterations in patients who are under anticoagulation therapy.

RPH (retroperitoneal hematoma) in patients with Covid 19 under anticoagulant can occur to unknown causes. On the other hand, it is assumed that their use can spontaneously lead to secondary RPH. In our case, age, history of high arterial pressure and SIRS developed by Covid-19 could be predisposing factors of RPH.

Recommendations

Covid 19 remains a challenge in the management and treatment of numerous complications. Attention should be paid to the factors of hypercoagulability and those predisposing individuals to hemorrhage to manage in time such life-threatening events as HRP.

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The role of the radiotherapy technician during prostate radiation treatment

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Abstract

Introduction: *Increasing positioning security is one of the main challenges of radiotherapy. The main movements of the prostate during radiotherapy are as a result of poor positioning of the patient, as well as by bladder and rectum volumes. These movements can be detected using various visualization techniques such as CBCT and radiographic images before each treatment session.* ***Purpose:*** *The purpose of this work is to highlight the role of radiotherapy technician in the management of the patient's movements during prostate treatment.* ***Methods:*** *8 patients after customized positioning and immobilization performed the treatment with Varian TrueBeam HD linear accelerator. CBCT's were performed on different days during the course of treatment as well as radiographic images on other days to verify the position. These positions were compared with the positions planned by the simulation scanner and the daily movements of the patient and the prostate were corrected, thus creating a new isocenter. In cases where and with the new isocenter the prostate and seminal vesicles are located outside the planned PTV, it is performed a new simulation CT scan and a new treatment plan.* ***Results:*** *From 8 patients with primary prostate cancer, 42 CBCT controls and 207 MV-KV controls were considered. Patients required an*

average movement of 0.27 cm in the vertical direction, 0.28 cm in the longitudinal direction, and a displacement of 0.17 cm in the lateral one. Regarding the rotation of the bed according to the X; Y; Z axes, we have an average Pitch of 1.32°, Roll of 0.5° and Rotation of 0.63°. ***Conclusions:*** *50% of these patients, needed a rescanning and replanning of treatment, and 12.5% more than one rescan.*

Key words: *Prostate cancer, Radiotherapy technician, Movement, CBCT, Radiographic imaging.*

Introduction

Prostate cancer is the most common cancer in men and has a mortality rate of 14.6/100,000 in our country. It is a pathology, the risk of which increases with age, and for this reason, it is absolutely necessary that after the age of 50, all men regularly perform a PSA analysis, as it is one of the indicators for the possibility of prostate cancer.

Prostate cancer has 2 main methods of treatment, which are radiotherapy and surgery, as well as another auxiliary method of these two, which is hormone therapy, and chemotherapy which plays a role in the case of metastatic cancer, when the cancer does not respond to hormone therapy. Each of these techniques has its own benefits and risks.

According to the stage, if it is an early stage, an average stage or a locally advanced stage, it is decided how the patient will be treated, with surgery or radiotherapy. In some elderly patients, we are forced to treat only with radiotherapy, since the accompanying diseases do not make it possible to perform surgery. But even in patients who can afford surgery, must be made a balance between the positive effects of surgery and the negative ones.

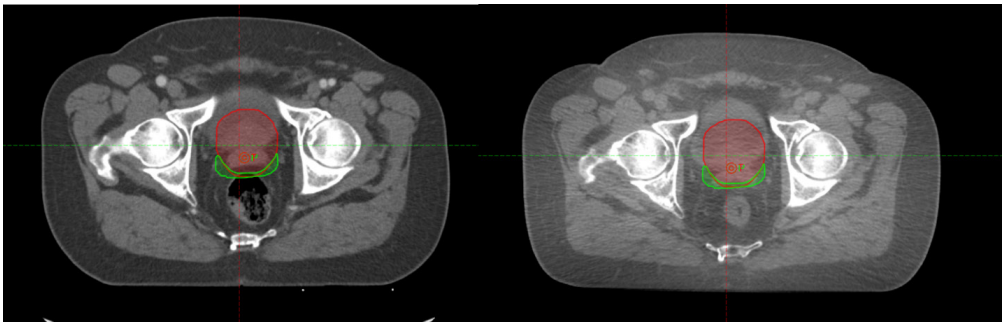
The benefits of surgery are usually the treatment of the pathology and therefore the relief of symptoms. As far as the negative effects of it are that it remains an invasive treatment method accompanied by complications like any other intervention, the most frequent of which are urinary incontinence or impotence, which significantly reduce the patient's life quality. Also in moderately advanced stages the risk of seeding the disease increases, this is reflected in the metastases found in different organs in these patients, which are unusual for prostate cancer.

While the first and biggest advantage of radiotherapy is the fact that it is a non-invasive method. The risk of impotence and urinary incontinence is often lower than with surgery, but even if it happens, it is a short-term effect. As for the negative part or the side effects of radiotherapy is the duration of the treatment that goes up to 7 weeks, the exposure to radiation which consequently increases

the risk of developing a malignant pathology in the future, as well as diarrhea and inflammation of the rectum which are the most frequent short-term effects in this patients.

However, the achievement of this result and the maximum avoidance or minimization of these side effects of radiotherapy undoubtedly have their own challenges. One of the main challenges of radiotherapy, of course not only in the case of the prostate but in all radiotherapeutic treatments, is the safety in positioning, the minimization of geometric inaccuracies and the correction of these uncertainties during the treatment course. The main movements are a consequence of the poor positioning of the patient as well as the volume of the urinary bladder or rectum. These movements can be detected using various visualization techniques such as CBCT (cone-beam CT) and radiographic images before each treatment session which are performed from radiotherapy technologist. Recognizing and correcting these movements is essential in order not to have untreated parts from the planned area, as well as the maximum preservation of normal tissues around.

In this image we have illustrated 2 CT scans of the same patient performed on two different treatment days where is visible the different volume of the rectum which has also brought the seminal vesicles closer to the sides of the PTV.



To manage these interfractional movements of the prostate we must perform periodic checks of the patient's position every day before treatment using the images obtained through CBCT and the radiographic images obtained through MV-KV. These data will help us in the future to determine the PTV margin, thus giving us the assurance that the volume determined by the doctor will receive the determined dose.

Methods

In our study were included 8 patients who underwent radiotherapy treatment near the radio-oncology center of the Hygeia hospital. The inclusion criteria in the study were:

- Prostate CA diagnosis
- Not to have performed a prostatectomy
- Treatment period from June 2023

Of these cases, 75% (6) of them were stage III, which means that the cancer is locally advanced, more likely to spread to the lymphatic stations and surrounding tissues, and 25% (2) of them were stage IV, which means the pathology has spread outside the prostate (one case was with vesical infiltration and the other case with bone metastases). The treatment plan for these patients in the R.O.C was:

- Personalized positioning in supination Wing Step + Knee fix and 3 tattoos in the pelvis
- Preparation of 1 liter of water 1 hour before the treatment, to fill the urinary bladder
- The patient was treated with VMAT technique, with Varian TrueBeam HD linear accelerator,
- Prostate and seminal vesicles were treated with daily fractionation of 2.25Gy, up to a dose of 74.25Gy, pelvic lymphatic stations with daily fractionation of 1.64Gy, 5 times a week, up to 54.12Gy.

At the beginning of each treatment day, a control of the accelerator, which is in optimal condition, is performed by performing an MPC (machine performance check) to verify the geometric part of the device and the energetic one. Then for the patients of our study, such a positioning control protocol was followed:

- In the first week of treatment, CBCT was performed on the first 3 days of treatment, followed by MV-KV checks on the remaining days of the week.

- In the following weeks, the control of the patient's position and the prostate was followed by performing 1 CBCT per week and MV-KV images on the other days.

These positions were then compared with the positions planned by the simulation scanner and the daily movements of the patient and the prostate were corrected, thus creating a new isocenter. In cases where and with the new isocenter the prostate and seminal vesicles are located outside the planned PTV, rescanning and replanning of the patient's treatment is performed.

Results

From these 8 cases that were studied with primary prostate cancer, a total of 42 controls with CBCT and 207 controls with MV-KV were taken into consideration, where the data for each of them are presented in the tables below.

PATIENT 1

	Dita 1	Dita 2	Dita 3	Dita 4	Dita 5	Dita 6	Dita 7	Dita 8	Dita 9	Dita 10	Dita 11	Dita 12	Dita 13	Dita 14	Dita 15	Dita 16	Dita 17	Dita 18	Dita 19	Dita 20	Dita 22	Dita 22	Dita 23	Dita 24	Dita 25	Dita 26	Dita 27	Dita 28	Dita 29	Dita 30	Dita 31	Dita 32	Dita 33
VRT	0.58	0.79	0.58	0.28	0.44	0.31	0.47	0.43	0.80	0.32	0.45	0.69	0.19	0.36	0.67	0.56	0.32	0.38	0.44	0.39	0.55	0.58	0.47	0.47	0.36	0.34	0.50	0.57	0.32	0.04	0.53	0.38	0.61
LNG	0.32	0.30	0.29	0.23	0.57	0.31	0.45	0.22	0.37	0.38	0.46	0.38	0.44	0.47	0.39	0.41	0.40	0.35	0.32	0.33	0.41	0.43	0.34	0.52	0.55	0.39	0.36	0.39	0.42	0.23	0.31	0.43	0.35
LAT	0.49	0.23	0.19	0.49	0.31	0.03	0.03	0.04	0.23	0.05	0.04	0.27	0.16	0.19	0.03	0.06	0.03	0.14	0.13	0.25	0.13	0.03	0.21	0.02	0.39	0.24	0.01	0.05	0.08	0.04	0.21	0.13	0.01
PITCH	1.50	0.20	0.90	0.10	1.20	2.00	1.70	1.20	1.90	2.10	1.10	0.70	1.80	1.50	0.60	2.00	1.40	1.50	1.70	1.30	2.60	1.10	1.30	1.50	2.30	0.40	-	1.50	1.40	0.50	1.40	2.60	1.60
RROLL	0.80	0.10	0.50	1.70	1.00	1.40	0.20	1.00	0.60	0.20	0.70	0.80	0.30	0.40	1.00	0.70	0.20	0.30	0.20	0.30	0.80	1.20	0.40	1.10	0.80	-	0.90	0.20	0.10	-	0.20	0.40	0.90
RTN	1.70	0.80	1.70	1.70	2.10	0.90	2.20	1.40	1.60	2.20	1.90	1.80	2.60	0.30	0.50	0.30	1.60	1.50	1.10	0.90	0.80	1.00	1.70	0.50	2.20	0.80	0.80	1.20	2.30	1.40	1.60	1.90	1.70

PATIENT 2

MV-KV	Dita 1	Dita 2	Dita 3	Dita 4	Dita 5	Dita 6	Dita 7	Dita 8	Dita 9	Dita 10	Dita 11	Dita 12	Dita 13	Dita 14	Dita 15	Dita 16	Dita 17	Dita 18	Dita 19	Dita 20	Dita 21	Dita 22	Dita 23	Dita 24	Dita 25	Dita 26	Dita 27	Dita 28	Dita 29	Dita 30	Dita 31	Dita 32	Dita 33
VRT	0.13	0.19	0.25	0.11	0.19	0.20	0.42	0.07	0.04	0.16	0.40	0.07	0.40	0.33	0.17	0.18	0.11	0.15	0.30	0.32	0.20	0.43	0.56	0.02	0.06	0.18	0.02	0.01	0.06	0.15	0.06	0.04	0.05
LNG	0.30	0.23	0.41	0.18	0.28	0.12	0.05	0.13	0.11	0.26	0.17	0.21	0.11	0.23	0.18	0.35	0.15	0.38	0.34	0.02	0.19	0.01	0.38	0.28	0.26	0.15	0.08	0.26	0.34	0.36	0.11	0.07	0.13
LAT	0.10	0.16	0.18	0.07	0.02	0.15	0.18	0.03	0.14	0.31	0.17	0.09	0.03	0.03	0.26	0.03	0.02	0.14	0.08	0.12	0.05	0.19	0.01	0.09	0.03	0.28	0.13	0.17	0.08	0.14	0.30	0.01	0.09
PITCH	0.70	1.50	1.00	0.10	1.60	0.20	1.50	0.20	0.20	0.80	0.10	0.50	0.20	1.80	1.80	1.10	1.40	2.10	1.60	0.60	1.80	1.00	1.90	1.50	0.50	0.80	1.90	-	0.80	1.30	1.20	0.70	1.30
RROLL	0.20	1.00	0.30	0.10	0.80	0.70	0.60	0.60	0.80	0.70	0.50	0.50	1.20	1.30	0.90	0.70	0.70	0.50	0.80	0.50	0.60	0.50	1.70	0.50	0.70	0.80	0.70	1.00	0.40	0.80	1.30	0.40	0.40
RTN	0.10	0.90	0.50	1.20	0.10	0.40	0.10	0.10	0.40	0.10	0.30	0.40	0.70	0.60	0.90	0.90	0.50	0.60	0.10	0.10	0.50	0.10	0.80	0.30	0.70	0.70	0.70	-	0.10	0.50	1.60	-	0.10

PATIENT 3

	Dita 1	Dita 2	Dita 3	Dita 4	Dita 5	Dita 6	Dita 7	Dita 8	Dita 9	Dita 10	Dita 11	Dita 12	Dita 13	Dita 14	Dita 15	Dita 16	Dita 17	Dita 18	Dita 19	Dita 20	Dita 21	Dita 22	Dita 23	Dita 24	Dita 25	Dita 26	Dita 27	Dita 28	Dita 29	Dita 30	Dita 31	Dita 32	Dita 33
VRT	0.05	0.09	0.12	0.16	0.05	0.41	0.08	-	0.07	0.03	0.13	0.21	0.02	0.21	0.24	0.29	0.28	0.29	0.08	0.33	0.18	0.13	0.26	0.11	0.22	0.17	0.19	0.23	0.40	0.11	0.13	0.11	0.14
LNg	0.09	0.33	0.15	0.30	0.29	0.41	0.26	0.33	0.39	-	0.12	0.05	0.07	0.24	0.12	0.19	0.31	0.21	0.28	0.34	0.09	0.16	0.27	0.21	0.32	0.19	0.29	0.23	0.24	0.19	0.22	0.22	0.34
LAT	0.16	0.16	0.03	0.07	0.08	0.41	0.13	0.43	-	0.01	0.17	0.10	0.40	0.19	0.09	0.24	0.20	0.22	0.35	0.17	-	0.17	0.21	0.05	0.17	0.12	0.07	0.02	0.09	0.04	0.07	0.07	0.08
PITCH	0.70	0.10	0.40	0.90	0.50	0.20	0.70	0.30	0.70	0.40	0.20	1.50	0.90	0.70	0.30	0.10	0.10	0.60	0.10	1.80	0.80	0.70	0.20	0.50	0.40	0.10	0.50	0.60	0.70	0.70	0.60	0.40	0.30
RROLL	0.10	0.20	0.40	0.20	-	0.80	0.30	0.30	0.60	0.20	-	0.10	0.30	0.10	0.30	0.10	0.10	0.20	0.50	-	-	-	0.60	-	0.10	0.10	-	0.10	0.30	0.20	0.20	-	0.30
RTN	0.10	0.10	0.40	0.10	0.20	0.60	0.10	-	0.30	0.60	0.20	0.60	0.10	0.30	0.60	0.40	0.30	0.20	0.30	-	0.50	0.20	0.10	0.10	0.20	0.60	0.10	0.40	0.20	0.10	0.30	0.10	0.40

PATIENT 4

	Dita 1	Dita 2	Dita 3	Dita 4	Dita 5	Dita 6	Dita 7	Dita 8	Dita 9	Dita 10	Dita 11	Dita 12	Dita 13	Dita 14	Dita 15	Dita 16	Dita 17	Dita 18	Dita 19	Dita 20	Dita 21	Dita 22	Dita 23	Dita 24	Dita 25	Dita 26	Dita 27	Dita 28	Dita 29	Dita 30	Dita 31	Dita 32	Dita 33	Dita 34	Dita 35	Dita 36	Dita 37	Dita 38
VRT	0.04	0.11	0.19	0.19	0.29	0.10	0.11	0.18	0.13	0.20	0.44	0.28	0.18	0.56	0.32	0.22	0.40	0.30	0.19	0.19	0.23	0.01	0.14	0.44	0.04	0.03	0.16	0.29	0.23	0.22	0.17	0.31	0.27	0.34	1.27	0.13	0.14	0.16
LNg	0.54	0.28	0.54	0.47	0.39	0.42	0.28	0.31	0.57	0.35	0.66	0.29	0.03	0.75	0.59	0.41	0.62	0.48	0.25	0.41	0.52	0.56	0.70	0.48	0.38	0.49	0.48	0.47	0.29	0.16	0.42	0.46	0.50	0.17	0.43	0.36	0.70	0.48
LAT	0.08	0.10	0.48	0.01	0.03	0.17	0.24	0.19	0.10	0.14	0.31	0.14	0.02	0.38	0.19	0.03	0.22	0.26	0.16	0.07	0.07	0.21	0.28	0.16	0.16	0.01	0.19	0.02	0.26	0.27	0.37	0.18	0.40	0.38	0.68	0.67	0.28	0.19
PITCH	0.40	-	1.20	1.00	-	1.20	0.40	1.80	0.30	0.80	1.50	1.60	1.40	0.10	0.50	0.10	0.40	0.60	0.10	0.30	0.50	0.10	0.60	1.10	-	0.70	0.30	0.60	1.20	2.70	1.80	1.30	0.10	0.80	3.00	3.00	0.60	0.30
RROLL	1.20	0.80	0.10	0.10	0.40	0.10	0.20	0.20	0.50	0.30	0.40	0.20	1.00	0.80	0.10	0.50	0.20	0.70	0.70	0.30	0.50	0.60	0.30	0.10	0.40	0.70	0.50	0.20	0.40	0.60	0.20	0.60	0.80	0.40	1.30	2.50	0.30	0.50
RTN	0.20	0.10	0.90	0.40	-	1.40	1.10	1.30	0.70	1.00	1.40	1.40	0.19	1.60	0.20	0.90	1.40	1.00	0.80	0.80	0.30	0.20	0.70	1.00	0.80	0.40	0.90	0.90	0.10	0.70	0.20	0.40	0.10	1.10	0.10	1.30	0.70	0.90

PATIENT 5

	Dita 1	Dita 2	Dita 3	Dita 4	Dita 5	Dita 6	Dita 7	Dita 8	Dita 9	Dita 10	Dita 11	Dita 12	Dita 13	Dita 14	Dita 15	Dita 16	Dita 17	Dita 18	Dita 19	Dita 20	Dita 21	Dita 22	Dita 23	Dita 24	Dita 25	Dita 26	Dita 27	Dita 28	Dita 29	Dita 30	Dita 31	Dita 32	Dita 33
VRT	0.04	0.05	0.16	0.09	0.03	0.29	0.11	0.02	0.44	0.11	0.31	0.38	0.27	0.25	0.17	0.32	0.15	0.05	0.09	0.43	0.17	0.08	0.28	0.30	0.19	0.24	0.34	0.19	0.28	0.25	0.21	0.32	0.45
LNg	0.38	0.44	0.28	0.35	0.40	0.40	0.48	0.41	0.43	0.26	0.27	0.19	0.04	0.35	0.29	0.21	0.16	0.45	0.41	0.25	0.23	0.35	0.35	0.30	0.37	0.29	0.38	0.29	0.58	0.15	0.26	0.34	0.36
LAT	0.09	0.06	0.08	0.17	0.07	0.21	0.27	0.37	0.22	0.26	0.24	0.10	0.12	0.16	0.07	0.06	0.05	0.10	0.20	0.07	0.17	0.18	0.02	0.17	0.06	0.03	0.04	0.03	0.15	0.09	0.05	0.06	0.03
PITCH	0.70	0.20	-	0.60	0.50	0.30	0.40	1.10	1.60	0.20	3.00	2.10	0.20	0.40	1.40	0.10	-	0.10	0.60	0.70	0.80	0.40	0.80	0.70	0.20	0.50	0.10	0.20	0.40	0.05	0.10	0.10	0.70
RROLL	0.50	-	0.20	0.40	-	0.50	0.40	0.70	0.60	0.40	-	0.40	0.20	0.20	0.90	0.60	0.60	0.10	0.80	0.80	0.50	0.30	0.30	1.20	0.20	0.60	-	0.50	0.50	0.60	0.60	0.70	0.20
RTN	0.30	0.10	0.20	0.20	0.10	0.40	0.50	1.20	0.10	0.40	0.70	0.50	1.50	0.40	0.20	0.70	0.10	0.40	0.80	0.60	-	0.30	1.00	0.70	0.30	0.90	0.50	0.80	0.60	1.30	0.90	0.40	0.40

PATIENT 6

	Dita 1	Dita 2	Dita 3	Dita 4	Dita 5	Dita 6	Dita 7	Dita 8	Dita 9	Dita 10	Dita 11	Dita 12	Dita 13	Dita 14	Dita 15	Dita 16	Dita 17	Dita 18	Dita 19	Dita 20	Dita 21	Dita 22	Dita 23	Dita 24	Dita 25	Dita 26	Dita 27	Dita 28	Dita 29	Dita 30	Dita 31	Dita 32	Dita 33
VRT	0.56	0.40	0.19	0.66	0.48	0.40	0.46	0.47	0.40	0.55	0.07	0.45	0.46	0.19	0.34	0.52	0.24	0.28	0.26	0.32	0.39	0.11	0.30	0.49	0.31	0.29	0.29	0.61	0.37	0.36	0.30	0.03	0.33
LNg	0.33	0.23	0.20	0.64	0.46	0.03	0.92	0.07	0.13	0.45	0.09	0.30	0.20	0.01	0.07	0.31	0.56	0.52	0.08	0.45	0.14	0.55	0.58	0.56	0.34	0.07	0.08	0.88	0.93	0.38	0.30	0.58	0.54
LAT	0.03	0.09	0.27	0.41	0.14	0.11	0.44	0.19	0.22	0.38	-	0.43	0.02	0.28	0.13	0.02	0.03	0.51	0.25	0.01	0.14	0.11	0.18	0.39	0.03	0.05	0.31	0.34	0.24	0.23	0.01	0.16	0.57
PITCH	3.00	3.00	0.30	3.00	3.00	2.30	3.00	0.90	3.00	3.00	1.80	3.00	3.00	3.00	3.00	3.00	3.00	1.70	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	1.50
RROLL	0.50	0.60	1.40	0.90	0.90	0.90	0.30	1.10	2.30	2.20	1.50	2.10	1.60	0.40	0.70	0.90	0.90	1.30	0.30	0.90	0.60	1.00	0.50	-	0.70	1.10	0.60	0.30	0.60	1.30	1.30	0.90	2.10
RTN	0.30	0.10	0.60	2.40	1.60	0.20	0.90	0.40	0.50	0.60	1.50	0.60	0.40	0.40	0.20	0.30	0.10	1.50	0.70	0.50	0.70	0.60	0.80	0.90	-	0.40	0.60	2.20	2.20	0.70	-	0.50	1.50

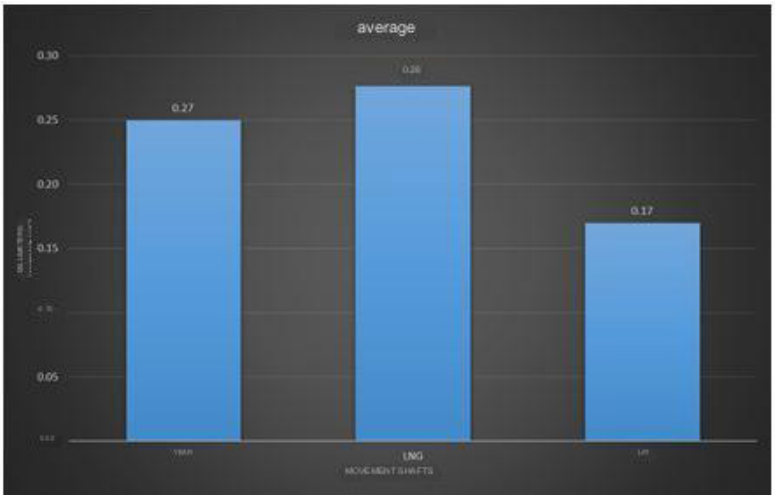
PATIENT 7

	Dita 1	Dita 2	Dita 3	Dita 4	Dita 5	Dita 6	Dita 7	Dita 8	Dita 9	Dita 10	Dita 11	Dita 12	Dita 13	Dita 14	Dita 15	Dita 16	Dita 17	Dita 18	Dita 19	Dita 20	Dita 21	Dita 22	Dita 23	Dita 24	Dita 25	Dita 26	Dita 27	Dita 28	Dita 29	Dita 30	Dita 31	Dita 32	Dita 33
VRT	0.56	0.40	0.19	0.66	0.48	0.40	0.46	0.47	0.40	0.55	0.07	0.45	0.46	0.19	0.34	0.52	0.24	0.28	0.26	0.32	0.39	0.11	0.30	0.49	0.31	0.29	0.29	0.61	0.37	0.36	0.30	0.03	0.33
LNg	0.33	0.23	0.20	0.64	0.46	0.03	0.92	0.07	0.13	0.45	0.09	0.30	0.20	0.01	0.07	0.31	0.56	0.52	0.08	0.45	0.14	0.55	0.58	0.56	0.34	0.07	0.08	0.88	0.93	0.38	0.30	0.58	0.54
LAT	0.03	0.09	0.27	0.41	0.14	0.11	0.44	0.19	0.22	0.38	-	0.43	0.02	0.28	0.13	0.02	0.03	0.51	0.25	0.01	0.14	0.11	0.18	0.39	0.03	0.05	0.31	0.34	0.24	0.23	0.01	0.16	0.57
PITCH	3.00	3.00	0.30	3.00	3.00	2.30	3.00	0.90	3.00	3.00	1.80	3.00	3.00	3.00	3.00	3.00	3.00	1.70	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	1.50
RROLL	0.50	0.60	1.40	0.90	0.90	0.90	0.30	1.10	2.30	2.20	1.50	2.10	1.60	0.40	0.70	0.90	0.90	1.30	0.30	0.90	0.60	1.00	0.50	-	0.70	1.10	0.60	0.30	0.60	1.30	1.30	0.90	2.10
RTN	0.30	0.10	0.60	2.40	1.60	0.20	0.90	0.40	0.50	0.60	1.50	0.60	0.40	0.40	0.20	0.30	0.10	1.50	0.70	0.50	0.70	0.60	0.80	0.90	-	0.40	0.60	2.20	2.20	0.70	-	0.50	1.50

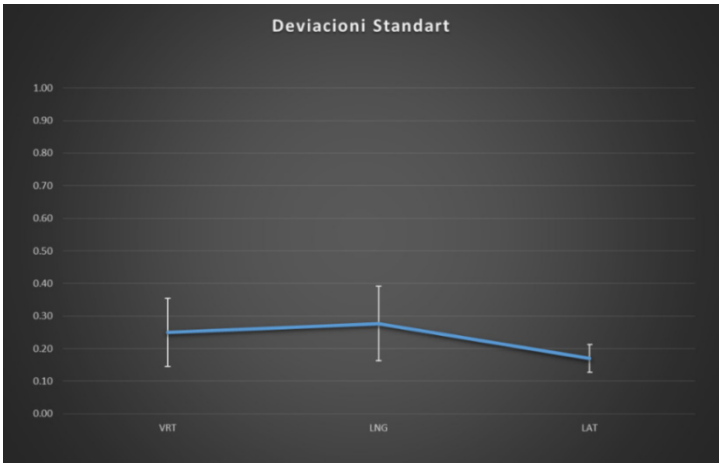
PATIENT 8

	Dita 1	Dita 2	Dita 3	Dita 4	Dita 5	Dita 6	Dita 7	Dita 8	Dita 9	Dita 10	Dita 11	Dita 12	Dita 13	Dita 14	Dita 15	Dita 16	Dita 17	Dita 18	Dita 19	Dita 20	Dita 21	Dita 22	Dita 22	Dita 23	Dita 24	Dita 25	Dita 26	Dita 27	Dita 28	Dita 29	Dita 30	Dita 31	Dita 32	Dita 33
VRT	0.06	0.08	0.22	0.12	0.21	0.13	0.41	0.34	0.03	0.11	0.14	0.14	0.36	0.06	0.08	0.41	0.34	0.12	0.13	0.22	0.03	0.21	0.14	0.36	0.11	0.14	0.08	0.06	0.12	0.21	0.34	0.03	0.14	0.41
LNg	0.23	0.13	0.13	0.16	0.19	0.15	0.14	0.09	0.23	0.09	0.19	0.20	0.19	0.23	0.13	0.14	0.09	0.16	0.15	0.13	0.23	0.19	0.20	0.19	0.09	0.19	0.13	0.23	0.16	0.19	0.09	0.23	0.20	0.14
LAT	0.10	0.01	0.25	0.19	0.19	0.05	0.34	0.38	0.18	0.55	0.02	0.38	0.10	0.10	0.01	0.34	0.38	0.19	0.05	0.25	0.18	0.19	0.38	0.10	0.55	0.02	0.01	0.10	0.19	0.19	0.38	0.18	0.38	0.34
PITCH	2.10	1.20	2.50	2.20	1.80	1.30	3.00	2.50	2.40	1.00	0.70	2.70	2.90	2.10	1.20	3.00	2.50	2.20	1.30	2.50	2.40	1.80	2.70	2.90	1.00	0.70	1.20	2.10	2.20	1.80	2.50	2.40	2.70	3.00
RROLL	0.30	0.40	0.60	0.50	0.50	0.90	0.50	0.70	0.10	0.40	1.20	1.10	0.70	0.30	0.40	0.50	0.70	0.50	0.90	0.60	0.10	0.50	1.10	0.70	0.40	1.20	0.40	0.30	0.50	0.50	0.70	0.10	1.10	0.50
RTN	0.70	0.20	0.60	0.70	0.80	0.40	1.10	0.80	0.10	1.50	1.10	1.10	0.50	0.70	0.20	1.10	0.80	0.70	0.40	0.60	0.10	0.80	1.10	0.50	1.50	1.10	0.20	0.70	0.70	0.80	0.80	0.10	1.10	1.10

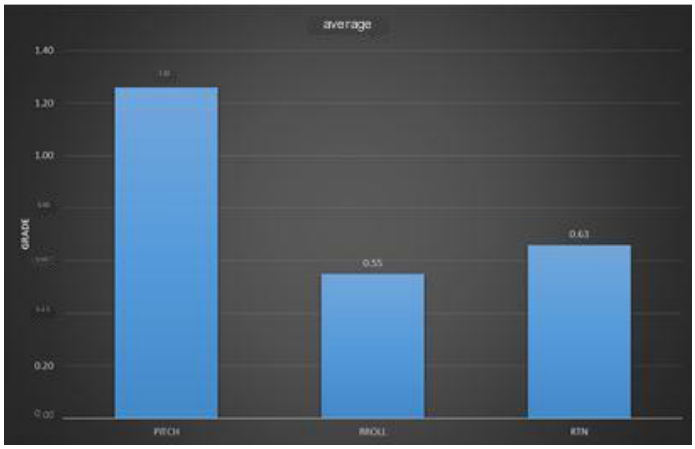
From these examinations it was found that the patients required an average movement of 0.27 cm in the vertical direction (anterior-posterior), 0.28 cm in the longitudinal direction (superior-inferior) and a displacement of 0.17 cm in the lateral direction (left-right). So the inaccuracy in the positioning regarding the geometry from the analysis of this data is less than 3mm.



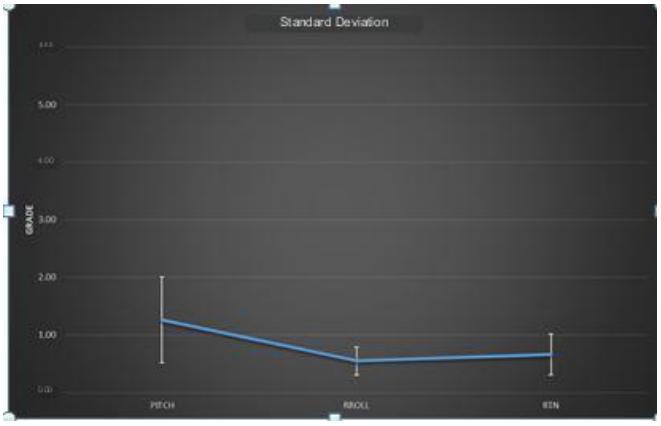
Standard deviation for X; Y; Z directions is 0.11; 0.11; 0.04 respectively



Regarding the rotation of the bed according to the X; Y; Z axes, we have an average Pitch of 1.32°, Roll of 0.5° and Rotation of 0.63°).



Standard deviation for PITCH; ROLL; ROTATION is 0.75; 0.24; 0.35 respectively.



In addition to these data, 50% of these patients needed a rescan and replanning of treatment, and 12.5% for more than one rescan and replan.

Discussion

The process of day-to-day implementation of the treatment plan is often neglected, but is of vital importance in ensuring accurate, safe and effective radiotherapy treatment, along with verification of the patient's position. The main duties of a radiotherapist technician during treatment are as following:

a) The radiotherapy technician is responsible for determining the position of the patient with the relevant immobilizing accessories with the aim of

accurately reproducing this position every day of treatment, and therefore the exact localization of the treatment volume, just like in the planning scanner.

b) The radiotherapy technician is responsible for preparing the patient for prostate treatment.
c) The radiotherapy technician is responsible for the verification through imaging techniques of the volume of the rectum, of the urinary bladder, as well as the inclusion within the PTV of the prostate and seminal vesicles,
d) The radiotherapy technician is responsible for providing the treatment and daily assessment of the patient's radiation tolerance, and the general medical condition.

Based on these duties and responsibilities of the radiotherapist technician, his role in the treatment of prostate cancer is essential in providing the most effective care and treatment to the patient. With his expertise and contribution to the treatment process, every day in every department, he can improve the quality of life of the patient and his family.

Conclusions

Since the radiotherapy technician is the one who practically implements the treatment plan created by the doctor and physicists, as well as deals with the management of every patient's daily needs his role is vital in ensuring an accurate and effective treatment, along with verifying the patient's position before each session.

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A pain fired from brain: Abdominal Epilepsy

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Abstract

Introduction: *Abdominal pain is a nonspecific symptom which can be caused by a constellation of pathologies. It can be related sometimes to pathologies that affect the brain and mind. Among pathological conditions that can cause paroxysmal gastrointestinal symptoms are porphyria, abdominal migraine, cyclical vomiting, intestinal malrotation and peritoneal bands. Among them, rare, but important to recognize is abdominal epilepsy. Abdominal epilepsy is more a diagnosis of exclusion, and it is considered to be part of the group of temporal lobe epilepsies, which usually occur in children. However rare, there is recorded documentation of its occurrence even in adults.*

Method: *We present two adult case reports with abdominal symptoms who have undergone several investigations before the diagnosis.*

Results: *In these patients the pellicular combination of the irregular paroxysm of abdominal pain, combined with symptoms involving the central nervous system and the exclusion of pathologies that can produce similar symptoms can guide the physician to the diagnosis of abdominal epilepsy.*

Discussion: *It should be suspected abdominal epilepsy when we encounter unexplained and recurrent gastrointestinal symptoms such as severe paroxysmal pain, hunger, flatulence, nausea and sometimes diarrhea. Symptoms are associated with central nervous system symptoms such as lethargy, confusion or alteration of consciousness and are improved with antiepileptic therapy. This diagnosis is usually associated with electroencephalography changes. The symptoms are quite vague and for this reason it is difficult to make a diagnosis.*

Keywords: *abdominal epilepsy, unexplained abdominal pain, EEG, adults, anti-epilepsy drug therapy, case report*

Introduction

Abdominal epilepsy (AE) is a rare syndrome in adults that presents with paroxysmal symptoms favoring more an abdominal pathology, but that is fired from the brain in form of seizure activity [(1).] The spectrum of abdominal epilepsy is characterized by: a) periodic abdominal symptoms that can't be explained after extensive medical testing b) symptoms that suggest a central nervous system involvement i.e. confusion, lethargy c) Abnormal electroencephalogram (EEG) with findings for seizure disorder d) sustained absence of abdominal symptoms with antiseizure therapy [(2)]. Zinkin and Peppercorn in their review of Abdominal epilepsy have covered 36 cases reported in literature [(3)]. Due to these nonspecific symptoms and predominance of abdominal symptoms is important to make it known to physicians to avoid misdiagnosing of these symptoms as "psychogenic". [(4)]

Method

Case report

Case 1

Patient 1 is a 40-year-old female. Three years prior to the first assessment at the Neurology Department of University Hospital of Tirana "Mother Theresa" she

experienced a non-convulsive loss of conscience. At the neurological examination it was shown brisk tendon reflexes without other signs. It was recommended to perform brain imaging and EEG, doppler of neck arteries, but the patient refused to undergo these examinations. She did a cardiologic evaluation, which resulted normal.

One year after, the patient had a non-convulsive loss of conscience assumed to be hypoglycemia. After some months she had episodes of recurrent paroxystic abdominal pain, which lasted 5 to 30 minutes, palpitation and flushing of the face, followed by tiredness and lethargy for a few hours.

From several years the patient suffers from headaches with migraines characteristics, related to her menstrual cycle, without aura or focal neurological signs. Headaches had a frequency of four per month and were relieved from non-steroid anti-inflammatory drugs. The headache was further amplified and one month before the second assessment of the patient in the Neurology Department it was severe with an intensity of 10 out of 10, reaching the peak in few minutes, bilateral temporal, throbbing as quality, with photophobia, phonophobia and lasted several hours (more than four hours), without aura or focal neurological symptoms. The pain was resistant to non-steroid anti-inflammatory drugs.

Episodes of abdominal paroxysm were localized at the periumbilical and the left hypochondria with increased frequency and severity during time. The month before the second evaluation they become daily (several episodes per day) with an urge to defecate. After that the patient had lethargy and feeling "dull" for several minutes to hours. Sometimes they were associated with headaches.

Regarding personal medical history: She has alopecia. The patient didn't undergo surgeries and do not use any medications (except the ones for headache attacks), doesn't use alcohol or illicit drugs, and doesn't smoke.

Blood and biochemical test were unremarkable. TSH, Vitamin B12 and Vitamin D showed at the normal range. The patient carried out several investigations: cardiology investigation, chest radiography, endocrinology and rheumatology investigation which resulted normal. Gastroenterology and infectious disease investigations also resulted unremarkable. ECHO Doppler of the neck arteries and temporal arteries showed normal results.

We carried out the tests for ANA; Anti DNA; Antiphospholipid antibodies; Anca-c; Anca- p which resulted negative. Lab results for Homocysteine; Protein S; Protein C; Antithrombin III; Factor V (Leiden): ACE also showed normal results.

FIGURE 1: MRI of the head: Sucentrimetric lesions of periventricular subcortical white matter and bilateral subcortical areas of cerebral hemispheres. Without enhancement after gadolinium.

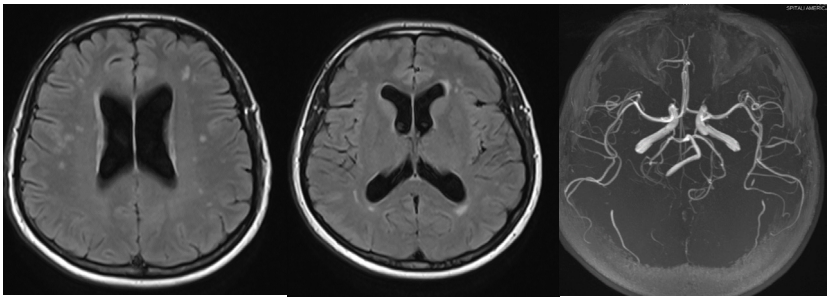


FIGURE 2: MRI of spine: Paracentral protrusion of C4-C5 intervertebral disc. Left foraminal protrusion of C5-C6 intervertebral disc. Central protrusion of the Th6-Th7 intervertebral disc.

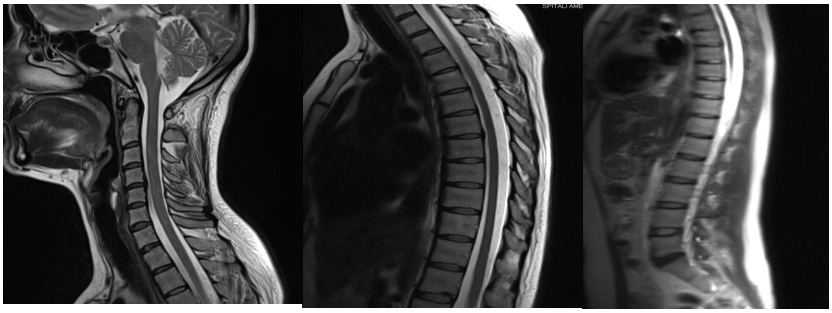


FIGURE 3: EEG: Slow waves with high voltage at the frontal regions more evident in the left derivations

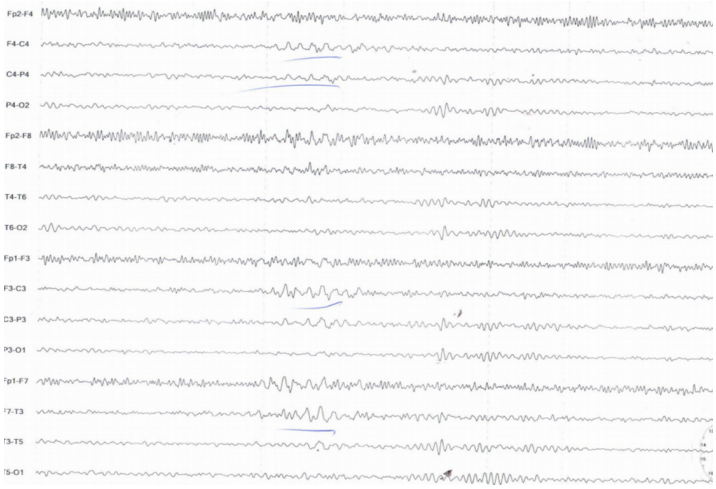
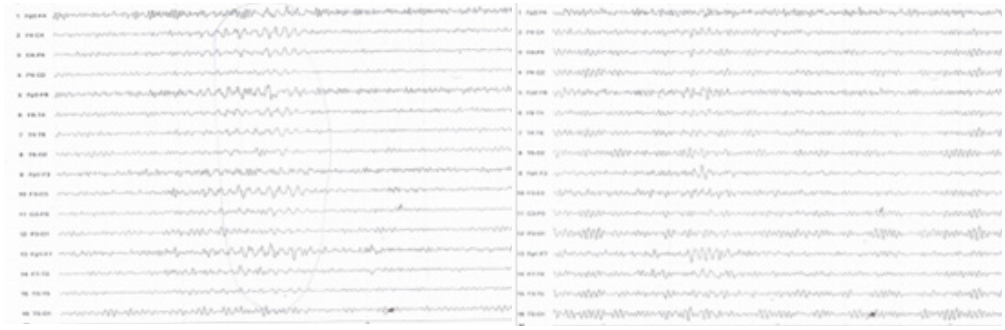


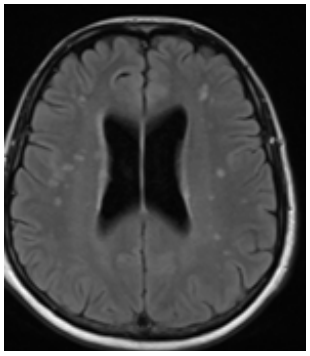
FIGURE 4: EEG (sleep deprivation): Slow waves with high voltage at the frontal regions more evident in the left derivations



The patient was previously assessed by a psychiatrist and he recommended to take SSRI. The episodes became more often during the treatment with SSRI; Also, it was referred that one episode was associated with twitching for few minutes of the right leg (clonic) and loss of conscience.

After the neurological consultation the SSRI was interrupted and it was started the antiepileptic therapy with Levatiracetam 1500 mg/daily. Over the course of the disease the symptoms improved, and the patient was seizure free after four months. She experiences headaches rarely.

FIGURE 5: MRI of the head at follow up (after two years)



MRI of the head after two years was without changes. The patient is still seizure free; we followed her up for several years and the therapy with levetiracetam slowly tapered. The patient rarely experiences headaches, with a frequency once per month.

Case 2

Patient 2 is a female, 33 years old, with a history of two episodes of syncope in ten years. Since several months the patient suffered from episodes of severe abdominal pain, paroxistic and severe, urge to defecate, pallor, sweating, without palpitations. Several minutes after the episodes the patient referred alteration of awareness and difficulty to speak. The duration of the episode was approximately 50 minutes, one episode was accompanied with loss of consciousness (non-convulsive). Episodes were rare at the beginning (once in several months/once a year) and were increased during the last year with a frequency of once in three months. One month before the appointment the patient had a loss of consciousness.

After the episode she had moderate headache at the occipital region, without nausea and vomiting, without photo-phono phobia or any neurological sign. The headache lasted several hours and was relieved by paracetamol and other non-inflammatory steroid drugs. The frequency of headaches was about one in three days. The patient is the fourth child in the family. The development and milestones were met normally. The patient had no febrile seizures. She referred to an episode of head trauma at the age of seven years old with loss of conscience. The patient also suffers from rheumatoid arthritis for several years and is under treatment with Medrol, Methotrexate, Ipsoflog. The patient doesn't use alcohol, illicit drugs, or smoke. There are no diagnosed neurological diseases in her family. Her mother suffers from dermatitis.

Blood and biochemical tests were carried out, thyroid tests and vitamins levels showed normal results. Cardiology evaluation and gastroenterology evaluation were carried out and the findings were unremarkable. Chest radiography was normal. CT of the head was done after the first episode with loss of conscience. Thereafter was performed a thoraco-abdominal CT with contrast which showed unremarkable findings.

FIGURE 6: MRI of the head: Two subcortical nonspecific lesions

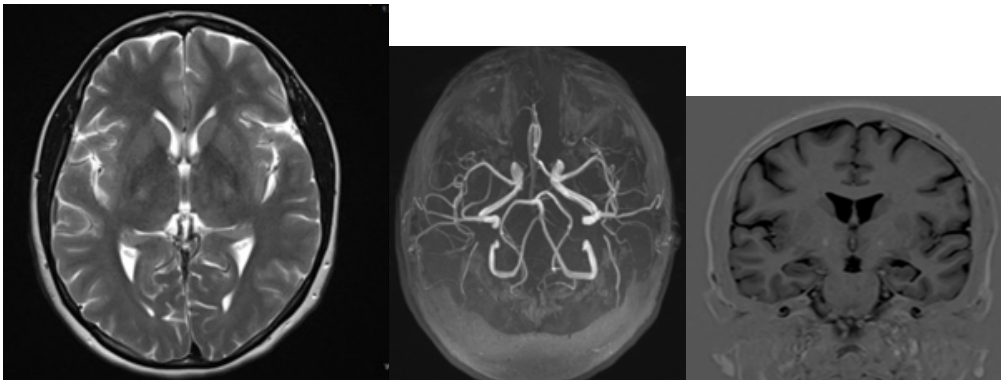
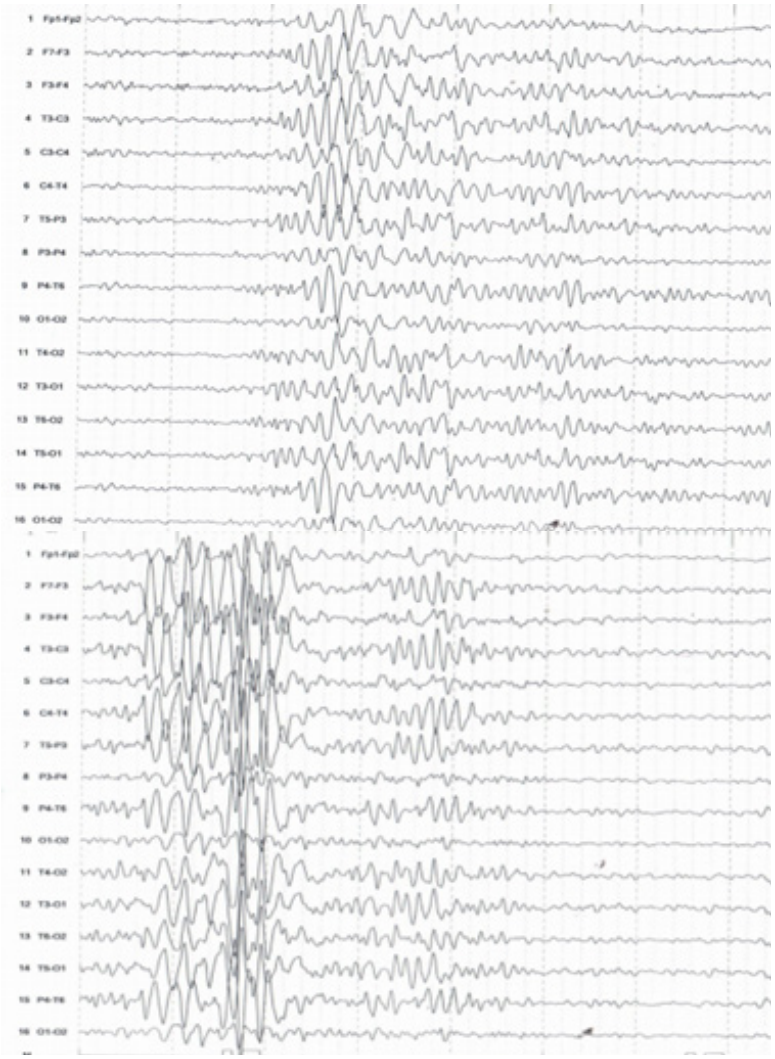
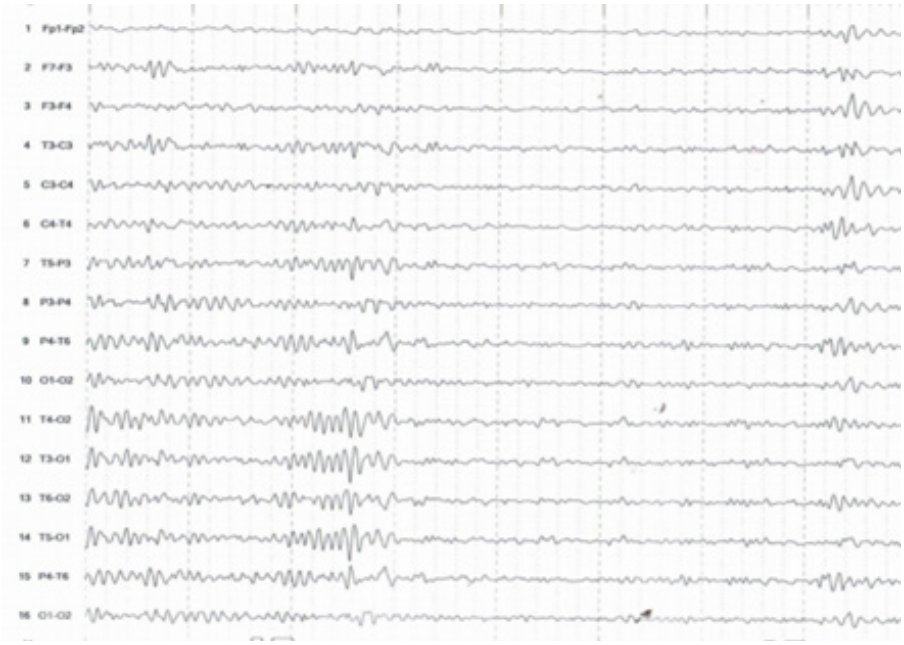


FIGURE 7: EEG: Diffuse paroxistic discharges



It was started the medication with anti-epileptic drugs Levatiracetam (1000 mg/day). The patient was seizure free for four months. During the follow up in seven years she had one episode in a year.

FIGURE 8: EEG after one month from the medication (improved)



Discussion

Abdominal epilepsy is a rare disorder, and it is often a missed diagnosis. It commonly occurs in the pediatric age group, but there is also documentation of its occurrence in adults [5]. It is characterized by otherwise unexplained, paroxysmal gastrointestinal symptoms and co-occurrence of central nervous system symptoms and abnormal EEG findings that point to a seizure disorder and are improved with antiepileptic drug therapy [3].

Abdominal epilepsy has multiple presenting symptoms. Gastrointestinal symptoms include abdominal pain presented more like short lasting cramping, nausea, hunger, flatulence, and diarrhea. The central nervous system symptoms are dizziness, lethargy, headache, mostly migraine like, confusion, loss of consciousness, and transient blindness [6]. Abdominal epilepsy is a type of autonomic epilepsy that can be associated with autonomic symptoms as sweating, pallor or cold. [7]

Although the several hypotheses, the cause of abdominal epilepsy remains still unclear. Some hypotheses relate the sylvian fissure and insular cortex as the origin of the seizure since they coincide with the locations of the abdomen on the sensory homunculus. Moreover, the portion M2 of MCA (middle cerebral artery) goes through the sylvian fissure [8]. Any pathology of the vessel, particularly at this specific segment, could be assumed to play a role in seizure activity arising from

the temporoparietal lobes. There are some reported cases of ictal abdominal pain associated with right parieto-occipital encephalomalacia, bilateral parietal atrophy and bilateral perisylvian polymicrogyria [9].

Recurrent abdominal pain is seen in abdominal migraine, peptic ulcer, and visceral hyperalgesia[10]. Abdominal epilepsy has overlapping features mostly with abdominal migraine, but the duration of symptoms is longer in abdominal migraine and EEG is usually without seizure activity, contrarily to abdominal epilepsy [6].

Conclusions

These cases show how challenging and time-consuming is the diagnosis of abdominal epilepsy, especially in adults. We need to keep in mind that abdominal epilepsy is a diagnosis that could often be missed by physicians. It should be taken as possibility in patients who present with episodic, recurrent, and paroxysmal gastrointestinal complaints along with symptoms which suggest the central nervous system involvement, after being excluded the most common causes and the symptoms do not improve with standard treatments. Also, we must be aware of misdiagnosis, especially for women who present with complains which do not fit in common diagnoses. When other diagnoses are excluded with routine examination, we should be cautious to not give the diagnosis of a somatoform disorder. In these cases, it is important to know and see the repeated pattern and we recommend considering an EEG (or a video-EEG) examination before labelling these symptoms as "psychogenic".

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Prevalence of drooling in patients with parkinson disease

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Abstract

Background and aims: *Drooling is the involuntary spillage of saliva from the mouth and is apparent in approximately 75% of individuals with PD and was historically interpreted as resulting from hypersecretion of saliva because of autonomic dysfunction. Alteration in salivary gland function is believed to arise from PD-associated changes in the autonomic nervous system and possibly involves the salivary para-sympathic*

ganglia. Irrespective of the amount of saliva produced, drooling probably occurs because of PD-related inability to efficiently swallow with normal frequency, an inability to fully close the mouth, and an anterior flexed head position. Recognizing and managing sialorrhea is an important issue to ensure quality of life for patients with PD. The study aims to identify prevalence of drooling at patients hospitalized at neurology department in Tirana and increasing awareness about the importance of sialorrhea treatment in PD patients.

***Methods*:** *In this retrospective study we investigated the prevalence of drooling in PD patients. We investigated the distribution of drooling according to sex and age and also the impact of drooling in this population by neurological examination and questionnaires given to them in a 6-month time distance. In addition, we studied the impact of gender in drooling in this population.*

***Results**: Our results show that most of the patients participating in the study showed signs of drooling. A significant correlation exists between drooling and stages of disease. Furthermore, in males, the correlation between the prevalence of drooling was found to be clinically significant compared to females.*

***Conclusion:** Our findings suggest that drooling is a major concern in the course of PD and should be addressed and treated early in patients with PD.*

***Key word:** Parkinson Disease, prevalence, sialorrhea, quality of life*

Introduction

Drooling, or sialorrhea, is a frequent non-motor symptom in Parkinson's disease (PD) (Ou et al., 2015). Studies found that pathologic sialorrhea may develop due to hypersalivation, together with various neurologic disorders including cerebral palsy, Parkinson's disease, and amyotrophic lateral sclerosis, or as an adverse effect of medications (Güvenç, 2018). Even when drooling does not unduly bother the individual, its potential consequences for swallowing, speech, oral and general health mean it should be attended to as a strategy to prevent other possible complications (Pedersen et al., 2018). The exact pathophysiological mechanism of drooling in Parkinson's disease (PD) is not yet fully understood. Healthy saliva flow produces around 0.75–1.5 liters per day (Miller, Walshe and Walker, 2019). Production varies throughout the day. Excessive drooling in patients with Parkinson's cannot be attributed to a single factor but to a mixture of factors, including but not limited to impaired nigrostriatal pathways (Polychronis et al., 2022). Surveys show that drooling can affect up to 78 percent of people with Parkinson's (Very well Health, n.d.). Drooling can be a devastating and debilitating complication of PD and is one of the most prevalent complaints of patients. It is often unrecognized and

undertreated (Isaacson et al., 2020). Some clinical factors participate in the onset of drooling while others are concomitant (Nascimento, 2021). As we have seen, drooling is more prominent during the "off" period. Two major domains possibly influencing the pathophysiology of drooling in PD have been proposed: one is an abnormality of salivary production, and the other is insufficient salivary clearance (Srivanitchapoom, Pandey and Hallett, 2014). Several other studies have also shown that a possible explanation is dopamine deficiency (Marg, Walz and Blenau, 2004). Supportive evidence consists of lesions at the striatum, globus pallidus, or its output pathway, which is the lateral mesencephalic reticular formation, could significantly decrease salivary secretion (Srivanitchapoom, Pandey and Hallett, 2014). Swallowing dysfunction in PD patients, in which the oropharyngeal phase is a major component, is the other domain that might contribute to drooling. Oropharyngeal dysphagia in PD patients can result from bradykinesia Impaired food transportation in Parkinson's disease related to lingual bradykinesia (Umemoto et al., 2010). The Drooling Severity and Frequency Scale (DSFS) has been shown to be a quick and accurate measure of drooling that can be used to help guide clinical management of drooling, particularly in patients who are unable to undergo the Drooling Quotient assessment (Rashnoo and Daniel, 2015). In addition, a recent study showed that severe hypomimia, unintentional mouth opening and stooped posture with dropped head, could cause drooling in PD patients. Hypomimia can affect the patients' ability to maintain saliva inside their oral cavity, and, therefore, cause drooling in PD (Kalf et al., 2011). It is reported that 70%–80% of PD patients worldwide are demonstrating sialorrhea (Isaacson et al., 2020). In moderately advanced PD patients, subjective drooling occurs in over one-third of patients and was significantly associated with decreased quality of life. Dysphagia occurred significantly more often in patients with drooling (van Wamelen et al., 2020).

There are several drug treatments that can address the problem of excess saliva and drool. Conservative management and speech therapy, oral therapy and botulinum toxin. Noninvasive management, which includes speech-language therapists, dentists, and physiotherapists, is often the first step in management for most providers, but unfortunately, these measures have not shown significant long-term benefits (Isaacson et al., 2020). And medication known as anticholinergics, such as Artane (trihexyphenidyl hydrochloride) and Cogentin (benztropine mesylate) in an attempt to dry up any excess saliva you may have. There are treatments that can help. These include medication, Botox injections, drops, or a spray that can dry your mouth.

There are not many studies in Albania related to this topic, so our study intends to emphasize the importance of drooling as an important clinical feature of PD.

Aim of the study

The main purpose of this study is to provide an overview of drooling in Albanian' patients to increase awareness on recognition and referral for care for patients with PD. Increased awareness will help nurses and caregivers address drooling at its earliest onset.

This study evaluated the prevalence of drooling in patients with PD, the stage of onset and the relationship between gender and drooling.

Materials and methods

This is a retrospective study in which 106 patients with PD are included. The data is collected from the PD patients from 18 to 65+ years old that were hospitalized in Neurology Service of UHC "Mother Teresa" in Tirana during the period 2021-2022 and that have given their consent. The patients were examined by our neurologists and the stage of the disease was confirmed by them too. We investigated the distribution of drooling according to sex and age and also the impact of drooling in this population by neurological examination. Discrete variables are shown in frequencies and percentages, while continuing variables are shown as standard deviation. The data is worked in Microsoft Excel 2013 and SPSS

23.0. There are several statistical tests used such as: χ^2, ANOVA, Fisher exact test. The internal consistency of the study is measured by Cronbach`s alpha.

Results

Most of the patients in this study were in stage II and III of the disease, 24.5% and 65.1 respectively. 62 patients of the study or 58.5% were males, while there were 44 female or 41.5%. Age of the patients included in this sample is from 38 years old to 85 years old. The mean age of the group was 67.6 ±9.0. The age group with highest number of patients were 56-65 years old and 66-75 years old; 22 and 26 males respectively, 13 and 18 females respectively.

TABLE 1: Age distribution of patients

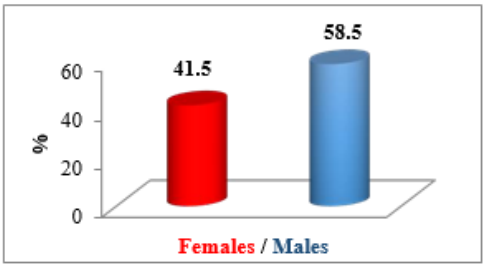
Age	total	Min	Max	Med.	Std. Dev.
	106	38	87	67.6	9.0

TABLE 2: Group ages according to sex

sex	36 - 45	46 - 55	56 - 65	66 - 75	76 - 85	86+	Total
M	1	1	22	26	12	0	62
F	1	5	13	18	6	1	44
Total	2	6	35	44	18	1	106

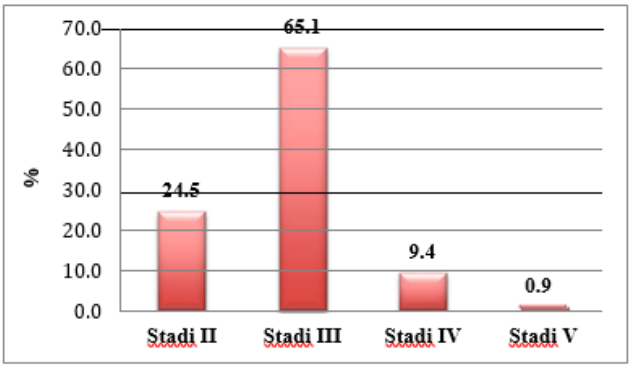
Our results show that a significant correlation exists between drooling and stages of diseases in our sample pf PD patients. The prevalence of drooling in males was found to be clinically significant compared to females. Therefore, 34% of male population with PD have drooling during the progress of the disease, while only 21.7% of female population with PD disease have drooling.

FIGURE 1: Sex distribution



As for the questionnaire, the Cronbach1s alpha was used and it was qualified as "good". So, the question "Do you have drooling during the daytime?", in the first month was answered YES by 55.7% (in which 34% are Males and 21.7% Females) of the group study and in the sixth month by 57.0% (in which 35% are Males and 22% Females).

FIGURE 2: Distribution according to the stages of disease



Discussion

Neurological disorders are an important cause of disability and death worldwide. Globally, the burden of neurological disorders has increased substantially over the past 25 years because of expanding population numbers and ageing, despite substantial decreases in mortality rates from stroke and communicable neurological disorders (Feigin et al., 2017). Recognizing, identifying, and addressing problems that affect the quality of life of patients with PD is an important part of health care services. Drooling is one of the most common complaints affecting Parkinson`s patients which often results in social isolation, embarrassment, depression, skin infections and aspiration pneumonia. Previously, sialorrhea has been underrecognized in Parkinson's disease (PD) patients. Despite this, many patients rank sialorrhea as one of the most debilitating complaints of Parkinson's disease (Isaacson et al., 2020). In the study was found that most of our patient's referee drooling as a clinical sign. In order to increase the quality of life of our patients it's necessity that this sign be taken in consideration and treated specifically along with all other concerns that patients with PD exhibit. In the study find as a limitation the fact that answering questionnaire might have been a little subjective. As in other studies, in our center the majority of patients who reported the symptom of drooling were men (Kalf et al., 2009).

Also in our study, in males, the correlation between the prevalence of drooling was found to be clinically significant in comparison to female population.

Conclusion

Drooling is a major concern in the course of Parkinson Disease and should be addressed and treated early in patients with PD. Training the nursing and caregivers on the importance and early management of drooling will serve to increase the well-being and quality of life of our patients. In order to increase the quality of life of our patients it's necessity that this symptom be taken into consideration and treated specifically along with all other concerns that patients with Parkinson Disease exhibit.

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Self-care for health and wellbeing – a literature review

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Abstract

Introduction: *Self-care concept is not a new idea, but during the scientific era that strengthened the authority of health care providers, the use of self-care became less valued. Self-care has major benefits for individuals and health care systems. Many factors influence self-care and several tools have been developed to measure an individual's ability to self-care. Health workers play an important role helping people understand and use self-care practices.*

Aim: *To provide an overview on self-care approach to better understand different aspects of self-care as important intervention for improving health and well-being.*

Methodology: *A series of recently published articles in PubMed, Google Scholar, Scopus, Web of Science as well as WHO guidelines related to self-care were identified*

and used for this review. A database of selected articles was created, and a reference list compiled.

Results: *The effectiveness of self-care interventions has been found in several published articles. In patients with various diseases, higher levels of self-care are associated with better health outcomes, including reduced hospitalizations, costs, and mortality. Various studies report that self-care is influenced by several factors such as: age, education, socio-economic and health education level, geographic environment, and family support. WHO has developed competency standards for health workers to support people's ability to self-care.*

Conclusions: *Humanitarian crises-armed conflict, natural disasters, major disease outbreaks have a significant impact on global health and require innovative strategies that go beyond the health sector. There is growing evidence of the effectiveness of self-care interventions for improving health and well-being. Health workers have a key role in implementing and promoting self-care interventions.*

Keywords: *self-care, health, wellbeing, quality of life, self-care measurement*

Introduction

The concept of self-care is not new, but it has recently received a new focus in global health policy. It originated with theorist Dorothea E. Orem in 1956 and has evolved over the years to the present day [1]. The World Health Organization defines self-care as "the ability of individuals, families, and communities to promote health, prevent disease, maintain health, and cope with illness and disability, with or without the support of a health professional" [2]. Self-care has major benefits both for individuals to take a stronger role in their own health and for the health care system by reducing the unnecessary use of health care resources and eases the pressures on health systems which are growing. Currently, much of the world's population lives in humanitarian crises, where health systems are challenged to provide essential services and many others have no access to essential health services at all. Pandemics such as COVID-19, armed conflict and climate change also hamper and stretch health services around the world [2]. The ability of individuals to care for themselves can play a crucial role in the prevention, management, and rehabilitation of various health conditions, including diseases.

Self-care interventions are among the most promising for improving health and well-being. The global burden of chronic non-communicable diseases as well as so-called "lifestyle diseases" results to a significant extent from individuals' lack of self-care skills. The benefits of self-care interventions have been documented in several documents, culminating in the publication of the World Health Organization Guidelines for Self-Care Interventions in 2019, previsioned on 2022 [3].

Several tools have been developed to measure an individual's ability to self-care for specific health issues or for different population groups [4], but no general self-care instrument exists [5].

A series of factors influence self-care in different health issues and different target groups [6]. Understanding how individuals make health decisions and what factors influence these decisions is critical to ensuring a strong self-care environment.

Many self-care interventions require the support of competent health workers to help people understand and use effective self-care approaches and tools. Although health workers play an important role in helping people understand and use self-care approaches, WHO suggests that there is an urgent need to find strategies that go beyond the health sector's response [3, 7]. The aim is to provide an overview on self-care approach to explore and better understand different aspects of self-care as an important intervention for improving health and well-being.

Methodology

A search of the most published literature was conducted, including peer-reviewed articles, full-text publications and available WHO strategy documents, to find relevant articles related to self-care issues. Recently published scientific articles in PubMed, Google Scholar, Scopus, Web of Science as well as WHO self-care guidelines were used for this review. An initial search was undertaken using a range of keywords, including 'self-care', 'self-management' or 'self-esteem'. A database was created, and a reference list compiled with all identified articles as presented in the references chapter.

Results

The concept of self-care remained vague until the late 20th century, when self-care began to become necessary with the rise of chronic diseases [8]. The oldest definition of self-care, which is cited by many articles, is the WHO definition, which dates to 1983 [9,10].

According to the available data, over half of the world's population is lack access to essential health services [11], health worker shortages are estimated to reach 10 million by 2030 [12] and 130 million people are in need of assistance under global threats of humanitarian crises [13] and pandemics such as COVID-19. These factors point to an urgent need to explore innovative strategies that go beyond health-sector response, such as self-care interventions [3].

Our overview found that the most innovative and effective approaches that support self-care for all health issues are self-care interventions. WHO defines self-care interventions as the evidence-based, quality tools that support self-care and include medicines, medical devices, counselling, diagnostics and/or digital technologies, etc. [3, 14]. WHO recommends self-care interventions for each country as a critical intervention to achieve universal health coverage, to reach people in humanitarian situations, to help them gain more control over their health [3].

Our overview found that much of the literature supports self-care as one of the primary care interventions for patients that enables them to make diagnostic and therapeutic decisions, self-manage the disease, and achieve optimal outcomes in health restoration [8, 15, 16, 17, 18].

Many studies showed that in patients with various diseases, especially chronic diseases, higher levels of self-care are associated with better health outcomes, including reduced hospitalizations, costs, and mortality [19, 20, 21, 22, 23, 24]. Several studies also showed that during the COVID-19 pandemic, the need and vital role of self-care behaviors in saving lives was more important. Using some life-saving self-care interventions with patients such as wearing masks, social distancing, have been an asset during COVID-19 periods of lockdown [3, 8, 25, 26, 27].

United Nations agencies estimate that self-care interventions are among the most innovative and efficient approaches, also for sexual and reproductive health and rights, for which greater commitments and investments are needed [28]. The effectiveness of self-care interventions in sexual and reproductive health has been found in several published articles [29, 30, 31].

We also found out that various publications emphasize the importance of promoting self-care as a cost-effective approach that significantly reduces the use of medical services and health care costs. Also, there is a need to understand and implement effective self-care promotion interventions in different health care settings [32,33].

Depending on the specific health issues, self-care is influenced by several factors such as family support, age, educational level, economic level, level of health education, geographic and sociocultural environment. Various studies have found that low education, poor socio-economic status, poor family support and lack of social support, not receiving health education were significantly associated with poor self-care practice, for both individuals and health care staff [34,35,36,37,38,39,40,41,42]. Self-care can be undertaken independently by a health care worker, but many self-care interventions require the support of health workers. WHO has developed competency standards for health workers to support people's ability to self-care [7,43].

There are several self-care measurement tools that address key aspects of self-care practices for health and well-being, but there is no comprehensive self-care assessment instrument that monitors and assesses all key aspects of self-care [4,16,24,44,45].

Conclusions

There is growing evidence for the effectiveness of self-care interventions in communicable and non-communicable diseases. Self-care interventions provide opportunities for individuals to make informed decisions about their health. WHO has developed the Self-Care Interventions guideline, which provides evidence-based recommendations for self-care interventions to improve health and well-being. Health workers have a key role in implementing and promoting self-care interventions, but there is a need to strengthen the capacity of health workers to support their clients' self-care effectively and safely. Various tools exist to measure individual self-care ability, but there is a need to develop a comprehensive tool that assesses individual self-care ability to include a wide range of self-care practices. Promoting self-care is a cost-effective approach and significantly reduces the use of medical services and health care costs.

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The cascade of multiorgan dysfunction in COVID 19 patients. A case presentation

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Abstract

Introduction: *The SARS COV 2 epidemic has caused thousands of deaths due to different mechanisms of organ injury, starting from the respiratory and cardiovascular system and followed with significant involvement of kidneys, liver, pancreas and several metabolic dysfunctions which all caused a rapid progression of disease*

leading to death within the second week of hospitalization. ***Method:*** *We present the case of a 67-year-old woman who died within 24 hours of admission due to a rapid deterioration of her clinical condition with several successive complications. Results: The patient developed a fulminant clinical course, starting with flu-like prodromal symptoms proceeding to altered mental status, metabolic acidosis, acute respiratory distress syndrome (ARDS) and renal failure within 3 days. The rapid involvement of several vital organs predicted a poor diagnosis since the first evaluation in admission which resulted to be irreversible.* ***Conclusion****: The predictors of poor prognosis and severity may help clinicians to apply therapeutic regimens in order to avoid disease progression to multiorgan damage and potentially death.*

Key word*: Covid 19, multi organ dysfunction, cascade, case report*

Introduction

The SARS COV2 infection manifested a rapid spread throughout the world, quickly reaching the proportions of a pandemic. Although in its beginnings, this disease managed to demonstrate two characteristics almost immediately: the high contagiousness but also the various complications which were fatal in a significant percentage of infected patients. Even today, in addition to the low number of cases with COVID 19, the complications associated with it are present and still potentially lethal. Apart from the fact that COVID-19 is conventionally accepted and conceptualized as a respiratory disease, clinical reports suggest that severe cases reflect an overlap of the phenomena of vascular dysfunction, thrombosis and cascade and cytokine storm. The most common complications include pneumonia, Respiratory failure, acute respiratory distress syndrome (ARDS), sepsis and septic shock, cardiomyopathies, acute renal failure, pulmonary thromboembolism.

Method

A 67-year-old female presented to the Emergency Room of Infectious Disease Hospital with dyspnea, fever and altered mental status. In her medical information form was evidenced that the symptoms had started 3 days ago and had rapidly and progressively worsened. In admission the vital signs evidenced temperature 97.9 F^{o}, blood pressure 135/98 mmHg, respiratory rate 35 per minute, heart rate 89 beats per minute and oxygen saturation 90% on oxygen therapy. The nasopharyngeal swab for COVID-19 polymerase chain reaction (PCR) testing was collected. Immediately after hospitalization, the patient was placed in the Intensive Care Unit

with worsening hypoxia, saturating up to 85% on fifteen liters with facial mask; the mental status was further altered, bradycardia with a heart rate of 46 beats per minute, and hypotension not responsive to fluid boluses requiring thus vasopressor therapy and emergent intubation. The initial blood work revealed presence of hemolytic anemia (RBC 2.700.000 Hgb 7.8 Reticulocite 9% , Indirect bilirubine 5.7 mg/dl) acute kidney failure (creatinine 6.71) acute pancreatitis (amylasemia 1785 U/L) and other metabolic derangements showing elevated potassium 6.1 mmol/L, glucose 375 mg/dl, C-reactive protein 23,6 mg/dl, alkaline phosphatase 121 U/L, lactate dehydrogenase 1640 U/L aspartate aminotransferase 157 U/L, alanine aminotransferase 202 U/L, white blood cells 27.1 K/UL, lactic acid 6.2 mmol/L, D-Dimer 8.74 mg/L and severe acidosis with bicarbonate of 11 mmol/L, anion gap 18, arterial blood gas pH 7.21, partial pressure of carbon dioxide (PaCO2) 48, partial pressure of oxygen (PaO2) 61 on fifteen liters via facial mask . Computer tomography (CT) of the head was negative for acute process. Meantime the chest showed bilateral ground glass infiltrates and the abdomen computer tomography showed diffuse enlargement of the pancreas with irregular contour of the margins of the pancreas.

FIGURE 1

FIGURE 2

FIGURE 3

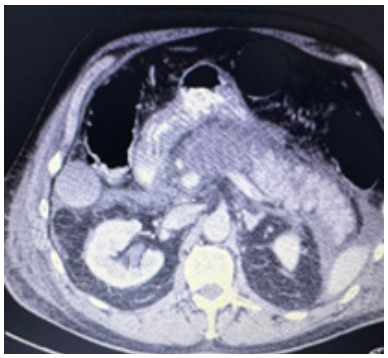

FIGURE 4

The follow-up biological examinations evidenced significant hyperkalemia 6.6 mmol/L, further aggravation of renal function with creatinine value of 7.19 mg/dl followed by metabolic acidosis with a lactic acid of 11.4 mmol/L and a hemogas analysis showing: pH 7.02, $PaCO_2$ 62, PaO_2 34 , bicarbonate 10 mmol/L).

After 27 hours of hospitalization the patient manifests extreme bradycardia, followed almost immediately by a cardiac arrest. The patient was assisted immediately by applying CPR (Cardio Pulmonary Resuscitation) but the return of vital signs was not achieved and exitus letalis was confirmed by Intensive Care medical staff.

Discussion

Looking back to one of the most important pandemic ,epidemiologically speaking, the COVID-19 pandemic, several retrospective studies worldwide tend to identify and highlight different predictive risk factors associated with disease severity and mortality .[1,2,3] The time frame of clinical and laboratory deterioration varies depending on the specific clinical and anamnestic features of the patient; on average major part of patients manifested complications like sepsis during the first 10 days of hospitalization and died during then third week of hospitalization .[5,6,7,8] The group of patients which manifested a poor prognosis and rapid deterioration were first presented to Primary Health Care services with symptoms that varies from mild to moderate ,such as productive cough, fever and dyspnea followed by a rapid worsening of the clinical course with severe ARDS ,followed by multiple organ dysfunction. The underlying process that could be explain these complications is the cytokine storm. The most relevant complications associated to this process are cardiac complications, acute renal failure (ARF) and metabolic decompesation.[4] Our patient manifested a rapid onset of septic shock, hemolytic anemia ,acute pancreatitis and acute renal failure. Consecutive hemogas analyses showed severe metabolic acidosis and ARDS which led to a fatal outcome in less than 72 hours of symptomatology and less than 30 hours of hospitalisation. Beside the cytokine storm associated to COVID 19, the extensive microvascular thrombosis also is now well described in patients with COVID-19 and may explain the severe multi- organ dysfunction .[9,10,11,12,13,]

One of these disfunctions is AIHA which is a relatively rare condition with an estimated incidence of 13/100,000 persons per year. Nevertheless, there is a progressive increase in the number of cases with hemolytic anemia, mainly correlated with the development of auto-Antibodies in the setting of COVID-19 . Given the known risk of thrombosis in patients with cold agglutinin hemolytic anemia, Maslov et al. (2020) speculated that this might contribute to thrombosis and the unfavorable outcomes in COVID-19 patients. [14] Appart from the COVID

19 pathogenesis, the hemolysis of RBCs can also be associated to morphologic and functional impairment due to virus infection. In case of co-morbidities such as hemoglobinopathies or other forms of inherited anemias ,this impairment can lead to poor prognosis.

Acute Renal Failure (ARF) is evidenced as one of the common complications of SARS COV2 infection and associated with in-hospital mortality. It can be present in almost 20% of patients with severe clinical conditions and manifested within the first week of hospitalization. It is important to highlight, in the first place, the coexistence between the acute renal precipitation and the septic shock which a major part of patients develop. The renal dysfunction thus may be related to sepsis pathogenesis, starting from hypoperfusion, acute tubular necrosis (ATN), microvascular thrombosis, or direct injury. Acute renal failure pathogenesis, in terms of COVID 19 infection involves the presence of angiotensin-converting enzyme (ACE) 2 receptors, and the high affinity that SARS-Cov-2 has towards these receptors. Some patients may also have an upregulation of these receptors, which explains the earlier or later onset of renal dysfunction[15,16,17]

Acute pancreatitis is another important complication due to SARS COV2 infection, despite its low incidence. The pancreatic dysfunction can be related to a direct cytopathic effect of SARS-CoV-2 virus on pancreatic cells (ACE 2 receptors are present in both exocrine glands and islets of pancreas) or can be mediated by a systemic immunological response to SARS-CoV-2 infection. [18,19,20]

The perfectly calculated regimen of critically ill patients with precipitation of multiorgan failure remains a challenge. Meanwhile, it is of vital importance that supportive and standard ICU protocols are followed, including fluid resuscitation combined with diuretics .Considering Acute Renal Failure as one of the most severe and potentially lethal complication, hemodialysis process has been a crucial part of intensive therapy. In several cases the continuous renal replacement therapy (CRRT) was shown to improve prognosis.

Recommendations

Multi organ disfunction in specific cases with SARS COV 2 infection is clearly related to several mechanisms which are already recognized, and respective therapeutic regimen and strategies have been formulated.

Identifying predictors of severity and mortality may help clinicians to apply therapeutic regimens in order to avoid disease progression to multiorgan damage, and ultimately death. One of those strategies may be early hemodialysis. Our patient obviously had strong indication to go under hemodialysis, but given the fulminant multiorgan failure, she was not able to tolerate the process. As a consequence, the fatal outcome was inevitable.

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The advantage of PET/CT in detecting bone metastases: a case report

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Abstract

Introduction: *When detecting bone metastases bone scintigraphy has been long used as the most sensitive radiological modality, especially in lytic metastases, to assess the spread of disease in skeletal structures. Currently bone scintigraphy and CT remain the gold standard for bone metastasis detection in oncological patients in our nation.*

Method: *We describe the case of a 45-year-old man who was diagnosed with large B-cell lymphoma and was having a whole-body PET/CT scan for staging purposes. The overall report identified the pathological lymph nodes, in more than one region of lymph node stations. These nodes had increased in size compared to the previous study of the patient. Diffuse skeletal pathological uptake of the radiotracer indicated the diffuse bone marrow infiltration, while the CT images alone showed no evidence of typical lytic bone lesions. Other findings included splenomegaly and secondary splenic infiltration.*

Discussion: *One of the primary diagnoses for which PET/CT is particularly effective is lymphoma, when it comes to identifying intra and extraosseous recurrence. This is particularly true when it comes to identifying marrow infiltration. Few centers in Kosovo and Albania have used the combined PET/CT modality in the last two*

years, besides the importance of including it as part of the imaging protocol in the follow-up of the patients with lymphoma, or oncologic patients in general.

Keywords: *Case report, PET/CT, scintigraphy, metabolically active, bone lesions, lymphoma.*

Introduction

Fusion imaging PET/CT is a new multimodality that enables correlation of results from two simultaneous modalities imaging in an analysis. While 18F-FDG PET shows features of tumor function and allows metabolic studies, CT displays great anatomic detail but does not provide functional information, when correlated with concurrently collected CT data, subtle findings at FDG-PET that would otherwise be ignored or interpreted as physiological variations can result in the identification of a malignant process [(5)].

Case description

We present the case of a 45-year-old male patient, diagnosed with large B-Cell lymphoma, undergoing a whole-body PET/CT for staging purposes after chemotherapy treatment.

The overall report detected the pathological lymph nodes distributed in the cervical region, mediastinal, pelvic and bilateral inguinal regions, specifying their increase in size compared to the previous study, the lymph nodes were categorized as pathological according to the anatomical CT size criteria (more than or equal to 15 mm of short axis), and by their high uptake of radiotracer, for lymph nodes smaller than 15 mm. Secondary splenic infiltration was evident both on CT due to splenomegaly and focal increased uptake of 18-FDG of the spleen.

The curiosity about this case was that PET/CT showed multiple/diffuse metabolically active bony lesions involving the cranial bones, both upper and lower extremities bones, vertebral column, and pelvic bones.

The CT showed no evidence of typical lytic lesions, or it only showed a mild reduction in the density of medullar pattern of bones mostly in the appendicular skeleton, reaffirming the advantageous PET-CT in bone metastases. The patient was classified as Deauville 5, "Progressive Disease".

FIGURE 1. The CT shows mild reduction in bone density in humeral head bilaterally. No typical metastatic lesions detected in the scapular bone nor first thoracal vertebra.

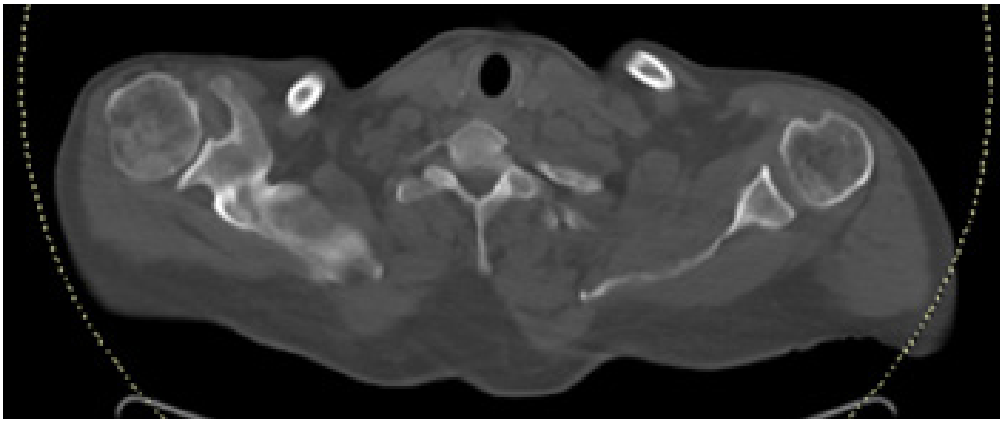


FIGURE 2. Same axial PET/CT image as in fig. 1, indicating increased uptake of 18F-FDG in both humeral heads. Increased uptake is remarked at the upper border of the right scapular bone and the first thoracal vertebra.

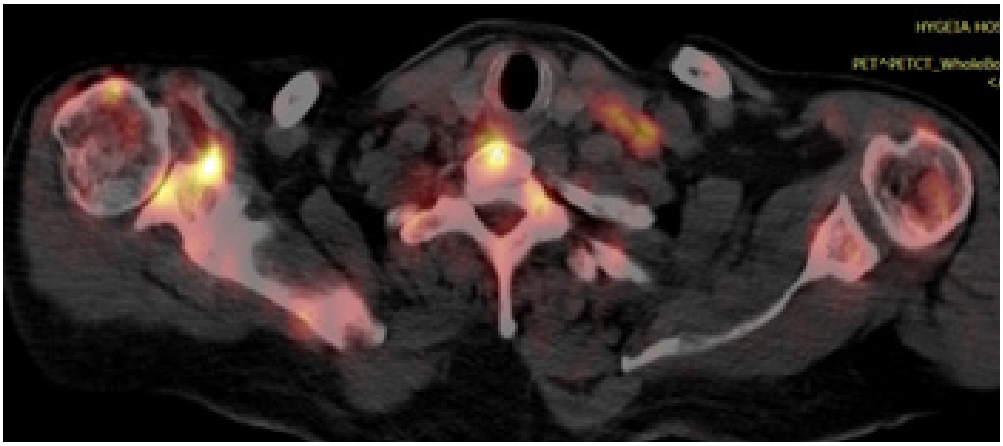


FIGURE 3A. Humeral diaphysis CT, mild reduced bone density. No typical lytic lesion evident.

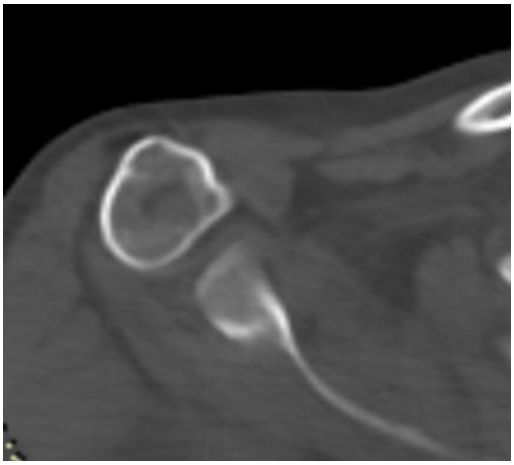
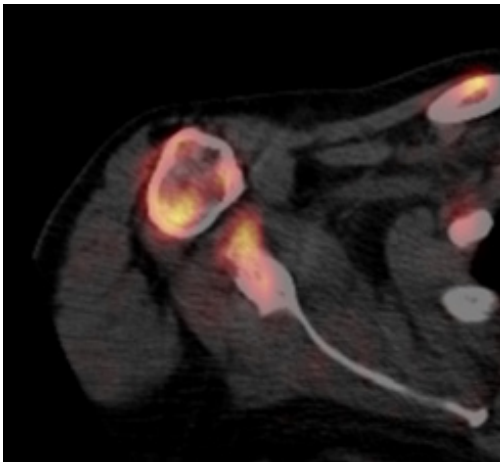


FIGURE 3B. Same axial image as in fig. 3a showing diffuse increased uptake of radiotracer in PET/CT.



Literature review

Fused images Positron Emission Tomography/Computed Tomography (PET/CT), has shown improved sensitivity in detecting bone metastases by quantifying the metabolic activity of malignant cells, thus indicating the presence of tumor metastases in bone. Various studies have been comparing the different modalities.

A prospective study conducted by the Portuguese Institute of Oncology in a period of 6 years in breast cancer patients, concluded that PET/CT is significantly more sensitive than bone scintigraphy in detecting bone metastases (respectively 93.3% vs 81.48%), it is more sensitive in detecting lytic bone metastases compared to bone PET. Bone scintigraphy resulted to be more sensitive than PET/CT only in cranial secondary lesions [(1)].

Another study, compared the three modalities, PET, CT and PET/CT fused images, in 1705 detected bone lesions of 123 patients with lymphoma, concluding that the low sensitivity in detecting bone metastases has been improved by combined modality PET/CT. Fused PET/CT modality ranged in sensitivity and specificity in various malignancies, but it was significantly higher in sensitivity and specificity especially in lymphoma[2].

A retrospective study, published in "Asian Pacific Journal of Cancer Prevention" in China, analyzed 530 patients in whom both 18FDG PET/CT and bone scintigraphy were done within one month, concluding that the sensitivity of 18FDG PET/CT was 97.8% the sensitivity of 18FDG-PET was 89.1% followed by bone scintigraphy and CT with 89.5% and 70.4% sensitivity respectively. More than 50% of the metastases were presented as lytic or sclerotic changes on CT[3].

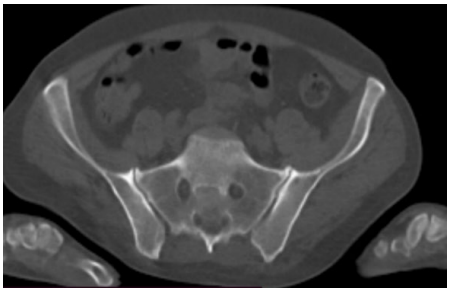
One of the main advantages of fused PET/CT is its ability to detect metabolic changes in the areas involved by malignant cells before the structural changes become visible, as with lymphoma in normal sized infiltrated spleen and lymph nodes. It is advantageous compared with CT in detecting lesions and may also change the stage of up to 8-20% of patients. A high value of uptake also suggests aggressive disease, for value of more than 10 of SUV[4].

Discussion

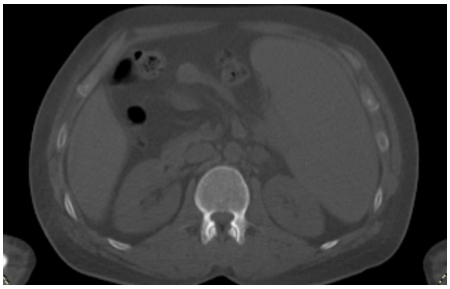
Lymphoma is one of the main diagnoses in which PET/CT is highly efficient, as concluded by many studies, especially in detection of marrow infiltration, resolution of metabolic activity before signs of complete healing on CT, detecting missed sclerotic metastases on bone PET, detection of intra and extra-osseous recurrence[2].

In the past two years, few centers in Albania and Kosovo, have implemented the fused PET/CT modality, by sharing this article we aim to share the experience of our center in the major advantage of bone metastases detected by fused PET/CT images when compared to CT and bone scintigraphy, thus, it is of high value making this modality more accessible for patients for an accurate staging of lymphoma or other oncological pathology.

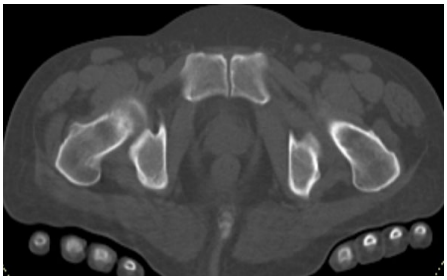
FIGURE 4 - a, b, c, d. No evidence of lytic lesions on the left CT image in the sacro-iliac bones (a), lumbar vertebra (b), ischium-pubic bones (c) and bilateral femoral diaphysis (d).



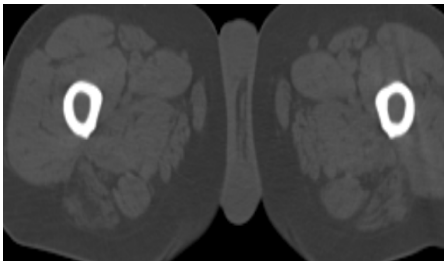
a.



b.

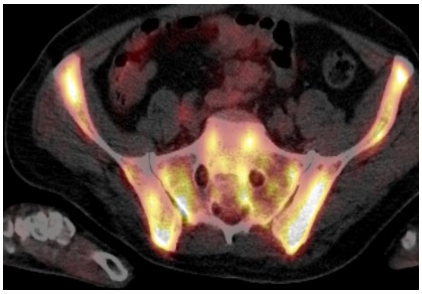


c.

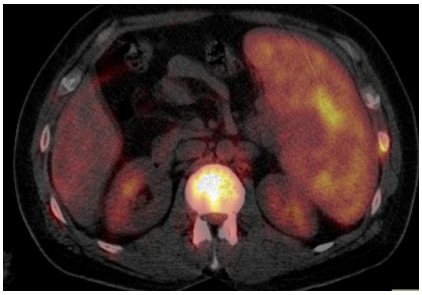


d.

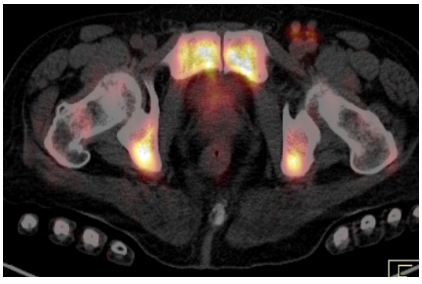
FIGURE 4 - e, f, g, h: Diffuse increased uptake of radiotracer on the e, f, g, h images, corresponding to the same axial planes as in a, b, c, d.



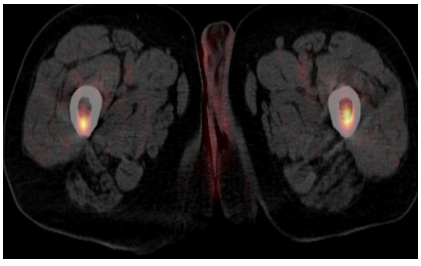
e.



f.



g.



h.

FIGURE 5 – MIP representation of the study. Diffuse pathological uptake of 18F-FDG in axial skeleton, Deauville 5.

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