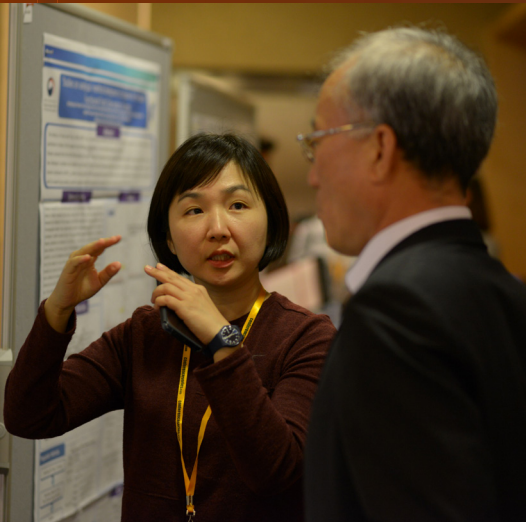
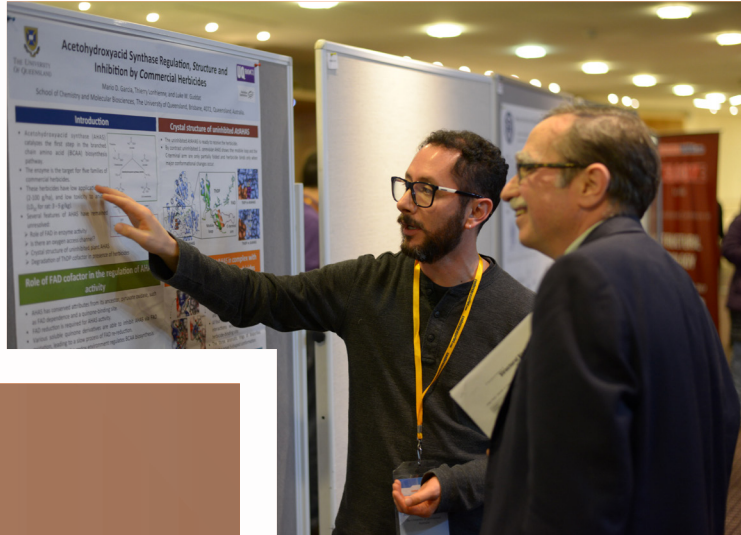


# RADIOLOGY AND ONCOLOGY

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# RADIOLOGY AND ONCOLOGY

July 16-17, 2018 Dubai, UAE

## New ethanol method for soft tissue imaging in micro-CT

Matej Patzelt<sup>1</sup>, Jana Mrzilkova<sup>1</sup>, Petr Zach<sup>1</sup>, Vladimir Musil<sup>1</sup>, Jakub Karch<sup>2</sup>, Frantisek Krejci<sup>2</sup>, Jan Zemlicka<sup>2</sup>, Jan Dudak<sup>2</sup> and Jozef Rosina<sup>1,2</sup><sup>1</sup>Charles University, Czech Republic<sup>2</sup>Czech Technical University in Prague, Czech Republic

**Introduction & Aim:** Micro Computed Tomography (micro-CT) uses X-rays to create sections of examined structures, which can be afterwards reconstructed into 3D models. Imaging of native soft tissues is very problematic due to their low intrinsic contrast. In the past years several techniques for attenuation of contrast of soft tissues were developed. It is possible to use either intravascular contrast agents or fixative agents. Most of these techniques are however quite expensive, very difficult to use or even toxic. The goal of our study was to find a new fixation method for soft tissue imaging in micro-CT, which would be cheap and easy to use.

**Method:** We used mouse organs-heart, lungs, kidneys, liver and brain. We fixed these organs in 97%, 50% ethanol solution and in a row of ascending concentrations of ethanol (25-97%). We scanned all specimens in micro-CT MARS (Medipix All Resolution System) after 72 hours, 168 hours and 336 hours period of fixation.

**Result:** Ethanol fixation provided contrast enhancement in all studied organs. Fixation in 97% ethanol provided very fast fixation and the contrast among the tissues was visible already after 72 hours of fixation. Fixation for period of 336 hours gave better detailed visualization. On the other hand, this type of fixation caused organs to petrify. Fixation in 50% ethanol provided best results after 336 hours of fixation; details were not visualized as good as in 97% ethanol, samples stayed soft. Best results were obtained in fixation in row of ascending ethanol concentrations. All organs were visualized in great details without damaging the samples.

**Conclusion:** New ethanol method is a great option for soft tissue fixation as well as the method for enhancing contrast among tissues in examined organs.

matej.patzelt@centrum.cz

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## RADIOLOGY AND ONCOLOGY

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**Role of 18F-FDG PET/CT in staging and response to therapy assessment for primary parotid adamantinoma-like Ewing's sarcoma: First case report****AlSugair F, Naim, Salloum R, Abouzeid M and Khan Z A**

King Faisal Specialist Hospital &amp; Research Centre, Kingdom of Saudi Arabia

**Aim:** Extra-skeletal Ewing's sarcoma is very rare tumors. Its adamantinoma-like novel histological variant is even rarer and has only been reported a few times involving the skeleton. Extra-skeletal occurrence of this variant has only been reported once before. We present the first case where 18F-FDG PET/CT was used both in staging and response to treatment assessment.

**Method & Material:** This 30-year-old man initially presented to local general hospital with few months history of right parotid swelling. A parotid tumor was diagnosed on CT and the mass was resected. Histopathology was initially reported as adenocarcinoma. Rapid recurrence and growth of the tumor led referral to the tertiary care hospital. Histology review and additional Fluorescence *In Situ* Hybridization (FISH) test confirmed the diagnosis of adamantinoma-like Ewing's sarcoma. The patient was offered VAlA chemotherapy (combined chemotherapy protocol) with radiation therapy. Imaging included PET/CT scans pre-chemotherapy and after 4 cycles. It was decided that if good response to chemotherapy was demonstrated, surgical resection could be offered.

**Result:** Pre-chemotherapy PET/CT showed a large 8.5×8 cm markedly FDG avid (SUV max 11.5) right parotid tumor. It reduced to 5.3×3 cm after 4 cycles of chemotherapy with significant reduction in FDG avidity (SUV max 3.9). PET/CT did not show any other disease site. Patient also had resection in addition to radiation therapy.

**Conclusion:** 18F-FDG PET/CT is a useful technique for staging and response to therapy assessment in primary parotid adamantinoma-like Ewing's sarcoma and helps in making clinical management decisions.

faisal.a.ashour@gmail.com

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# RADIOLOGY AND ONCOLOGY

July 16-17, 2018 Dubai, UAE

## Treatment of glioblastoma by resveratrol nanoparticles

Mohsena Shoja<sup>1</sup> and Shahryari Shookab  
Semnan University of Medical Sciences, Iran

**G**lioblastoma is a malignant human cancer that confers a dismal prognosis. Temozolomide (TMZ) and ionizing radiation (IR) is applied as the standard treatment for malignant gliomas. Despite advances in the combination of conventional surgery, radiotherapy and chemotherapy, median survival is poor. Radiotherapy remains merely palliative because of the existence of glioma stem cells (GSCs), which are regarded as highly radioresistant “seed” cells. Recent studies have revealed that Res has growth inhibitory activity, and it induces apoptotic or autophagic cell death in a number of human cancer cell lines. Nowadays, nanoparticles (NPs) can be loaded with therapeutic compounds such as phytochemicals, improving their bioavailability and their targeted delivery within the GBM tumor bulk. The present results suggest that Res-loaded nanoparticles could be useful for malignant glioma therapy and they can increase the toxicity of TMZ in GBM cells mainly through the inhibition of the G2/M arrest. **Keywords:** Glioblastoma, Resveratrol, Nanoparticle, Cancer, Radioresistant.

### Biography

Mohsen Shoja graduated from the Shahid Beheshti University of Medical Sciences at Tehran. He spent 10 years working in Radiology, CT scan and MRI medical imaging centers and now he is an instructor at the Paramedical School of Semnan University of Medical Sciences with a Master degree in Radiobiology and Radiation protection.

moh3n\_sh\_66@yahoo.com

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# RADIOLOGY AND ONCOLOGY

July 16-17, 2018 Dubai, UAE

## MRI-guided breast biopsy and breast cancer: Basics and cases

**Laila Abu Tahoun**

King Hussein Cancer Center, Jordan

Breast MRI plays an essential role in early detection, diagnosis and treatment of breast cancer. The development of MR-guided breast biopsy has enhanced the value and acceptance of breast MRI as part of multimodality breast imaging. Technique of Breast MRI includes multiplanar imaging of both breasts before and after intravenous contrast administration. Indication for breast MRI include screening for high-risk women, contralateral breast screening and assessment of disease extent including chest wall invasion in newly diagnosed breast cancer cases, post neoadjuvant chemotherapy, post lumpectomy with positive margin, breast evaluation in axillary adenopathy with unknown primary, better lesion characterizations and evaluation of breast implants. Findings on Breast MRI include focus or foci, non-mass enhancement and masses. These are categorized using the ACR BIRADS based on their features and enhancement patterns. Work up of suspicious MR findings includes focused ultrasound and magnification views and biopsy accordingly. Indications for MR- guided breast biopsy include all BI RADS 4 and 5 suspicious finding with no correlate on ultrasound or magnification views. Using MR- guided vacuum-assisted biopsy we diagnosed small breast cancer less than 1 cm and ductal carcinoma in situ in treated breast cancer patients on surveillance and in screened women. We also diagnosed contralateral breast malignancy at time of staging workup and residual after lumpectomy. MR-guided breast biopsy has enabled the diagnosis of small and early breast cancer in different phases of patient care including screening, staging workup and surveillance of breast cancer patients.

### Biography

Laila Abu Tahoun is Consultant Radiologist and the Director of Breast Imaging Unit at King Hussein Cancer Center in Jordan. She obtained the European Board in Breast Imaging. She has graduated from the University Medical School of Debrecen in Hungary with Summa Cum Laude degree and completed Radiology residency at Islamic Hospital in Jordan. She has more than 10 years in Breast Imaging and intervention. She has led the KHCC BIU to the successful accreditation by HCAC. She is operating the mammography mobile vans projects together with the JBCP. She is interested in teaching quality breast imaging and has conducted many workshops and lectures including hands-on training in breast imaging. She is one of the Editors of the Radiographer Manual and reviewer of the National Breast Cancer Screening and Diagnosis Manual. She is the Scientific Committee leader at the Jordan Radiologic Society.

labutahoun@gmail.com

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# RADIOLOGY AND ONCOLOGY

July 16-17, 2018 Dubai, UAE

## Imaging of ring enhancing brain lesions: A systematic approach and the impact of advanced imaging modalities

**Heba Ibrahim Ali**

Ain Shams University Specialized Hospital, Egypt

Ring-enhancing intracranial lesions are common and puzzling diagnostic dilemma and still a challenge to characterize even with the use of MRI. Routine brain MR imaging is very sensitive in the identification of ring enhancing lesions, but it lacks some specificity, for instance it cannot distinguish between neoplastic and non-neoplastic lesions, in a large percentage of these cases. Frequently, the differentiation of a tumor from an infection is quite difficult, based solely on conventional MRI. Therefore, advanced MR techniques as proton Magnetic Resonance Spectroscopy (1H-MRS), Perfusion-weighted imaging and Diffusion Tractography Imaging (DTI) have been employed in the differential diagnosis of these lesions with variable success rates. The purpose of this presentation is establishing a systematic approach to examine intracranial ring enhancing lesions and to verify the role of advanced MRI techniques in the differential diagnosis.

hebaali\_m@hotmail.com

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# RADIOLOGY AND ONCOLOGY

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## The potential impact of dynamic upright MRI in the surgical management of patients with degenerative lumbosacral spine disease

**Heba Ibrahim Ali**

Ain Shams University Specialized Hospital, Egypt

In cases of clinical and radiological mismatch, conventional MRI fails to demonstrate convincing finding to explain patient's symptoms that warrant surgical intervention. Completely open MRI scanner allows upright, angled-intermediate, as well as recumbent imaging. This would at the same time allow partial or full weight bearing and simultaneous kinetic maneuvers of the patients' whole body. The objective of the study was to assess the utility of upright dynamic MR examination to reveal occult lesions of the lumbar spine and the underlying etiology of low back pain or sciatica in conventional MRI, under-estimated these findings.

hebaali\_m@hotmail.com

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# RADIOLOGY AND ONCOLOGY

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## Re-establishing patency of occluded metallic biliary stents by endobiliary-RF ablation technique

**Bhatnagar Shorav and Sharma Gagan**

QRG Central Hospital &amp; Research Centre, India

**Background & Aim:** Biliary drainage with the use of Metallic Biliary Stents (MBS) is a well-accepted palliative therapy for patients with unresectable malignant hilar obstruction. These stents often lose their patency over a period of 6-9 months secondary to tumor ingrowth or overgrowth, epithelial hyperplasia. Occlusion caused by sludge deposition or clot or stone formation. Limited treatment options are available for such a condition. Endobiliary Radio Frequency Ablation (RFA) has been shown to be an effective modality in the treatment of malignant biliary obstruction. Here we present our experience with endobiliary RFA technique for restoring the patency of occluded MBS.

**Method:** Patients were taken with previously placed MBS for malignant etiology, presented with rising serum bilirubin and signs of cholangitis secondary to occlusion of MBS. Percutaneous trans-hepatic biliary drainage was achieved in all cases. After negotiating guide-wire across the stent, biliary drainage was established. After treating cholangitis, endobiliary-RFA was performed. Post-procedure cholangiogram was performed to ascertain the patency. Periodic clinical follow-up was scheduled for 6-months or till their survival.

**Result:** The patients were followed up clinically and with USG to a minimum of 6 months or till their survival. The presence of pneumobilia on USG along with normal LFT were considered as the signs of stent patency. All patients showed restoration of patency on cholangiography examination performed on the following day of RFA (restored diameter 6-8 mm). The mean duration of stent patency after the first session of RFA was 3.9 months (range 2-7 months) which was comparable to the primary patency of these stents (4.8 months). This extended period of stent patency ensured administration of additional cycles of chemotherapy in these patients coupled with objective improvement in the quality of life. Progressive tumor in growth through the openings between the struts of the stents can lead to stent block, thereby significantly reducing their primary patency. Till date little progress has been made in terms of improving the duration of stent patency for malignant strictures. Endobiliary RF ablation is a recently developed option in the management of such patients. Stent patency achieved after RFA is comparable to the primary patency of biliary stents.

**Conclusion:** Our experience suggests that endobiliary-RFA with balloon-sweep maneuver can be a safe and useful technique for re-establishing the patency of occluded MBS. Re-opened stent with good short term patency offers medical oncologist a chance of administering additional chemotherapy which may improve patient's survival.

drshorav@yahoo.com

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# RADIOLOGY AND ONCOLOGY

July 16-17, 2018 Dubai, UAE

## Interventional hemodynamic managements of hepatic encephalopathy associated with portosystemic shunts

**Bhatnagar Shorav and Sharma Gagan**

QRG Central Hospital &amp; Research Centre, India

**Objective:** To describe various techniques for reduction/occlusion of the blood flow in gastro-renal/leino renal shunts for controlling the arterial ammonia level causing hepatic encephalopathy and suggesting the best technique according to individual patient needs.

**Method:** In 11 patients, different technique of blood flow reduction in shunt was used according to size, shape and position and origin of the shunt. Out of 11 patients, 8 underwent for shunt obliteration, 2 underwent for splenic artery embolization and 1 underwent for leino renal shunt reduction. For leino renal shunt reduction, a stent (preformed hour glass shape) was deployed in shunt and multiple coils of varying sizes were deployed in the space between stent and shunt wall. For obliteration of shunts, catheter was positioned deep inside the varix and after inflating the balloon sclerosing agent in the form of foam was infused with the goal of filling the full extent of varices. For reduction of flow in shunt, polyvinyl alcohol particles were infused in lower pole branches of spleen. It causes decrease blood in splenic vein.

**Result:** 7/8 shunt obliteration, 1/1 shunt reduction and 2/2 partial splenic artery embolization showed significant reduction in arterial ammonia level.

**Conclusion:** Ammonia level can be controlled by controlling blood flow through the shunts. Various interventional methods are available and must select according to the size, shape and position of shunt.

drshorav@yahoo.com

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# RADIOLOGY AND ONCOLOGY

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## Assessment of Ga-68 prostate specific membrane antigen progress using PET/CT in patients with prostate cancer

**Habibollah Dadgar**

Imam Reza International University, Iran

Prostate cancer is one of the most malignancies affecting men. Recurrence of prostate cancer is usually assessed by elevating serum Prostate-Specific Antigen (PSA) level. These days, new radiotracers using Positron Emission Tomography (PET) have demonstrated new insights recurrence of disease. Meanwhile, emerging Ga-68 Prostate Specific Membrane Antigen (PSMA) provides opportunities to localize prostate cancer in low level of PSA and recurrence. In the current report we presented intense uptake in Ga-68 PSMA, (PET)/Computed Tomography (CT) in early and late monitoring of 74 years old male patient with prostate carcinoma diagnoses. An automated synthesis module (Scintomics GRP, Fürstfeldbruck, Germany) and 68-Ge/68-Ga generator (Pars Isotope, Tehran, Iran) used for radio-pharmaceutical production was purchased. Disposable cassette kits and chemicals including the precursor DKFZ-PSMA-11 were obtained from ABX advanced biochemical compounds. A HPLC system was used to determine the radiochemical purity. Radionuclidic purity of the final product solution and separation cartridges was analyzed using gamma spectrometry. Fast radio-labeling of HBED-CC represents which this radiopharmaceutical is a stable at room temperature. Stability procedures controlled with distinct temperature conditions during the radio-labeling reaction and directed predominantly to the formation of the thermodynamically more stable one. 68Ga-PSMA-HBED-CC (68Ga-PSMA-11) radio-synthesis implemented using a cassette-based procedure. Clinical 68Ga-PSMA-HBED-CC PET/CT scanning resulted in high quality images in patients. 68Ga-PSMA-11 is a promising radiotracer in which has better sensitivity and specificity for even low level of prostate cancer lesions versus the conventional imaging.

reza.it.dadgar@gmail.com

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# RADIOLOGY AND ONCOLOGY

July 16-17, 2018 Dubai, UAE

## Direct evidence of viral infection and mitochondrial alterations in the brain of fetuses at high risk for schizophrenia

**Segundo Mesa Castillo**

Havana Psychiatric Hospital, Cuba

There is increasing evidences that favor the prenatal beginning of schizophrenia. These evidences points towards the intra-uterine environmental factors that act specifically during the second pregnancy trimester producing a direct damage of the brain of the fetus. The current available technology doesn't allow observing what is happening at cellular level since the human brain is not exposed to a direct analysis in that stage of the life in subjects at high risk of developing schizophrenia. In 1977, we began a direct electron microscopic research of the brain of fetuses at high risk from schizophrenic mothers in order to find differences at cellular level in relation to controls. In these studies we have observed within the nuclei of neurons the presence of complete and incomplete viral particles that reacted in positive form with antibodies to Herpes Simplex Hominis type-I [HSV1] virus and mitochondria alterations. The importance of these findings can have practical applications in the prevention of the illness keeping in mind its direct relation to the etiology and physiopathology of schizophrenia. A study of amniotic fluid cells in women at risk of having a schizophrenic offspring is considered. Of being observed the same alterations that those observed previously in the cells of the brain of the studied fetuses, it would intend to these women in risk of having a schizophrenia descendant, previous information of the results, the voluntary medical interruption of the pregnancy or an early anti HSV1 viral treatment as preventive measure of the later development of the illness.

segundo@infomed.sld.cu

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# RADIOLOGY AND ONCOLOGY

July 16-17, 2018 Dubai, UAE

## Imaging with new PET tracers in oncology

**Alka Chengapa**

Apollo Hospitals, India

New PET tracers in oncology—presently 18F-fluorodeoxyglucose (18-F FDG) are the workhorse of PET imaging in Oncology. However, the main disadvantage is its non-specificity. HCC, neuroendocrine tumors, prostate tumors, CNS tumors and renal cell carcinomas may show low or absent FDG uptake. New tracers have been developed to give better sensitivity and specificity. Some are used in clinical practice, while some are still undergoing clinical and pre-clinical trials. Those that are already used for clinical applications include 11C- and 18F-Choline, 11C-Methionine and 18F-FET, 18F-DOPA, 68Ga-DOTA-somatostatin analogues, 11C-acetate and 18F-FLT and 68Ga-PSMA.stu . Other tracers are used in PET not as markers of metabolic activity but as markers of hypoxia inside big neoplastic masses. These compounds (the most important are 18F-MISO, 64Cu-ATSM and 18F-EF5) which highlight the presence of hypoxic areas are useful for patients who must be treated with radiotherapy. In fact, it is well known that hypoxia is one the strongest factors associated for treatment resistance and hypoxic areas should be recognized and over-treated compared to non-hypoxic malignant tissues.

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## Decision-making of cancer patients about end-of-life: The lived experience

Angela Katrina G Fonte  
Far Eastern University, Philippines

Understanding the perception of an end-stage cancer patient about end-of-life decision making can help the patient's relatives, healthcare providers and the person himself or herself in attaining the best quality of life in their exit event. The aim of this study is to deeply gain an understanding of the voice and feelings of stage 4 cancer patients in making decisions for end-of-life. The study was conducted using a qualitative phenomenological approach. Five participants who are of sound mind and able to make rational decisions shared their preferences. The participants were selected using a non-probability, criterion, purposive sampling. Data were gathered through the use of a semi-structured interview. Four major themes emerged from the analysis of the data. The themes were leaving protracted misery, divesting the burden, feeling of complacency and living in a former time. These themes encircle mainly on the issue of cycle of suffering and prolonging one's agony with the use of life-saving measures which can reduce the quality of life. Findings of the study revealed that end-of-life decision making is encapsulated with different factors which include physical discomfort and exhaustion, emotional distress, spiritual dilemma and financial burden. Recommendations include educational training for nurses about end-of-life care and discussion of ethical issues, culturally competent care and management of patients who are facing end-of-life decision making. It is also recommended that physicians should take the lead and explore the end-of-life preferences of patients and their families.

katrinafonte@yahoo.com.ph

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# RADIOLOGY AND ONCOLOGY

July 16-17, 2018 Dubai, UAE

## Prevalence of hepatic fibrosis using shear wave elastography among Filipino patients sonographically assessed with fatty liver disease

**Jonathan Agustin R Castro**

Cardinal Santos Medical Center, Philippines

**Background:** Fatty liver disease is the most common finding in abdominal ultrasound examinations, wherein a relevant percentage may develop liver cirrhosis. This study reveals the prevalence of hepatic fibrosis on patients who with fatty liver disease and takes into account the association of both factors.

**Aim & Method:** All shear wave ultrasound results from February 1, 2016 to January 31, 2018 were reviewed. The total patients with and without fatty liver disease and hepatic fibrosis were tabulated. Mean shear wave values were recorded and classified according to the degree of fibrosis.

**Result:** Of the 208 patients having fatty liver disease, a total of 142 (68.3%) patients had evidence of fibrosis. Only 66 (31.7%) patients had normal results. 126 (88.7%) of the patients with fibrosis had were classified mild, 12 (9.2%) of them were moderate and 3 (2.1) were severe. 23 (16.2%) were within 20-39 years, 67 (47.2%) were between 40-59 years, 47 (33.10%) between 60-79 years and 5 (3.5%) were >80 years. 77 patients (54.2%) were male and 65 (45.8%) were female. Age and gender were tested for correlation to hepatic fibrosis using a CI=95% which revealed a p-value of <0.98 for age and <0.93 for gender; both were not significant. The prevalence of fibrosis in patients with hepatic steatosis was tested for significance with a CI=95% revealing a p-value of <0.0001, which was significant. Association between steatosis and fibrosis was also tested using a CI=95% showing a p-value of <0.0001, which was significant.

**Conclusion:** This study reveals that the prevalence of hepatic fibrosis on patients with fatty liver disease is statistically significant. A significant association between fatty liver disease and hepatic fibrosis has been proven in this study. There is however, no gender or age range predisposition for hepatic fibrosis.

tamcastro88@gmail.com

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# RADIOLOGY AND ONCOLOGY

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## Lazy lateral technique: An innovative approach for upper outer quadrant breast cancer near the anterior axillary fold

Mohamed I Abdelhamid  
Zagazig University, Egypt

**Introduction:** Surgical treatment of breast cancer was challenged over years. Breast conservation is as oncologically safe as mastectomy and gives better cosmetic and psychological outcomes.

**Aim:** Aim of our study was to evaluate the oncological and esthetic outcomes of the lazy lateral technique as a new approach for tumor located at the upper outer quadrant near anterior axillary fold.

**Patients & Methods:** Between October 2012 and September 2014, 18 patients with early breast cancer at the upper outer quadrant and near the anterior axillary fold were surgically treated with the lazy lateral technique.

**Results:** The age of our patients ranged from 36 to 58 years (Median: 47 years). Most of the patients in this study were diagnosed as having infiltrating ductal carcinoma (14 patients, 77.7%). The size of the tumor ranged from 0.9 to 3.8 cm. No involved margin on frozen section. Seroma was the most common postoperative complication and developed in two (11.1%) patients. The cosmetic outcome was excellent in 12 (66.6%) patients, good in five (27.7%) patients and satisfactory in one (5.5%) patient. No local recurrence or systemic metastasis was noticed in our patients during a median follow-up period of 38 months (Range: 27-49 months).

**Conclusion:** The lazy lateral technique is a novel approach for surgical treatment of upper outer quadrant breast cancer near the anterior axillary fold. It is an oncologically safe procedure and promotes satisfactory esthetic outcomes.

dr\_moh2003@yahoo.com

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# RADIOLOGY AND ONCOLOGY

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## Focus where it matters, optimizing 4D and 5D imaging tools for extracranial radiosurgery

**Shankar Vangipuram**

HCG Cancer Center, India

**Introduction:** Extracranial radiosurgery involves shooting surgical doses of radiation for the management of moving targets cancer/oligometas and is characterized by accurate target delineation, robust motion management and fast dose delivery (3-8 fractions).

**Method:** Basic 3D medical imaging acquisition and reconstruction principles are based on the assumption that the object being imaged is static over the course of the acquisition. Patient motion and organ distortion, whether the result of voluntary patient movement or natural functions such as respiration, can impact target design due to artifacts and thus delivered doses will be less accurate and precise. Instead, a common strategy employed was to expand the target volume by a safety margin to accommodate the estimated motion of the target volume and then to irradiate larger fields under the expectation that this would compensate for the unknown motion which would lead to higher toxicity when we are treating stereotactic targets (measuring less than 5 cms).

**Results:** In the past two decades, imaging, planning and delivery technologies have progressed to the point that it is now possible to deal with a 4D model of the patient (consisting of three spatial dimensions plus time as the fourth dimension) which is simply called 4D radiotherapy. The introduction of 4DCT into radiation therapy was quickly followed by 4D MRI, 4D cone beam CT and 4D PET. All these tools have enabled us to capture the motion information accurately and can be utilized in the delivery of the treatment.

**Conclusion:** 5D imaging, are dynamic 3D images (4D) that are acquired at multiple time points and patterns of deformations are analyzed. The correlations in 5th dimension using deformable image registration softwares (e.g. the pattern of deformation for dynamic CT imaging) can be extracted for recognition, tracking and diagnosis of the complications of radiosurgery. Techniques to optimize 4D imaging and 5D imaging and incorporating into the workflow for radiosurgery will be the key into the future of safe radiosurgery practice.

atree.kundu@hcgoncology.com

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# RADIOLOGY AND ONCOLOGY

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## Hyperglycemia induced hemichorea-hemiballismus in a 71-year old female presenting with involuntary unilateral movements: A case report

Michelle Regina L Castillo and Catherine M Lazaro

University of the Philippines-Philippine General Hospital, Philippines

**H**emichorea-hemiballismus is a rare presentation of non-ketotic hyperglycinemia, usually involving elderly females. A 71-year old female, with poorly controlled diabetes, presented with a one-month history of involuntary unilateral movement beginning with the left arm spreading to the ipsilateral lower extremity. Computed Tomography (CT) imaging of the brain revealed nonspecific hyper-density in the right basal ganglia. Further work-up with the use of Magnetic Resonance Imaging (MRI) was done showing abnormal signals in the right basal ganglia. In this case, we note the significance of detecting rare findings in diabetic patients through different imaging modalities such as CT and MRI, as differentiated from other more common pathologies causing neurologic symptoms. Prompt diagnosis would alert the clinician to the cause of the movement disorder. Correcting the hyperglycemia reverses this condition.

michcastillo@gmail.com

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## KFSDH experience as the first paperless RadOnc department in the Kingdom of Saudi Arabia

Bilal Jalal, Wamied Abdelrahman and Ahlam Dohal

**Introduction:** The Department of Radiation Oncology at King Fahad Specialist Hospital Dammam (KFSDH) started operation in 2005 with two Varian® LINACS 600 CD and 2300 CD with paper-based documents. All patient documents were required to be printed, signed and archived. In 2015 our department went through a major upgrade where two TrueBeam machines with the state-of-art technology. At that time, the decision was made to transform the department into a paperless environment.

**Methods:** A multidisciplinary task force committee was established with representatives from the whole department with the goal of replacing the existing paper-based documents with an equivalent electronic format. The electronic patient documents were integrated into our patient information system, Aria® 13.6. We have also utilized the patient care path and workflow features of the system. To facilitate the access of patient data from different locations, we increased the number of workstations (hardware), as well as purchased adequate number of licenses (software).

**Results:** Since 2016 we managed to become a paperless department. This transfer allowed for: (1) Tracking of patient treatment progress easily, (2) improving patient file readiness efficiency which reduced patient delays, (3) ensuring patient file completion and reducing the number of missing data, (4) eliminating the space required for storing all printed patient documents and (5) securing patient documents by using digital storage and backup. There are a few features that we are currently exploring, such as, the activity capture and billing system, which are in line with the current vision of Ministry of Health hospitals. In addition we are looking into linking our system with the hospital information system (MedicaPlus) by using an HL7 interface integration solution.

**Conclusion:** In summary, there are many benefits from transforming a radiation oncology department into a paperless or electronic environment. Many departments worldwide went through this transformation. In our opinion, it is better to build and customize your own electronic environment rather than mimicking someone else's experience. This transformation should be done gradually and the participation of all department members, taking into consideration available resources, is essential for success. The department should assess its existing infrastructure before making the transition, which may require a substantial capital investment (hardware, software and network).

bilaljalal@gmail.com

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## RADIOLOGY AND ONCOLOGY

July 16-17, 2018 Dubai, UAE

## Investigation of production routes and production cross sections of non-standard PET radionuclides

Muhammad Shahid, Kwangsoo Kim and Guinyun Kim  
Kyungpook National University, South Korea

It is conventional to use standard Positron Emission Tomography (PET) radionuclides ( $^{11}\text{C}$ ,  $^{13}\text{N}$ ,  $^{15}\text{O}$ ,  $^{18}\text{F}$ ) for imaging; however, the decay energy  $<3$  MeV and  $\beta^+$  intensity ( $>10\%$ ) of some other radionuclides (called non-standard) also makes them correspondingly suitable for PET imaging. The importance of non-standard PET radionuclides (e.g.  $^{45}\text{Ti}$ ,  $^{60}\text{Cu}$ ,  $^{61}\text{Cu}$ ,  $^{64}\text{Cu}$ ,  $^{86}\text{Y}$ ,  $^{124}\text{I}$ ) in clinical nuclear medicine has been realized by imaging the biological systems. Cyclotrons are the best solution to produce desired beta emitters. Smart choice of target and projectile makes it possible to produce the PET radionuclides in most economical way. Keeping in view the importance of medical radioisotopes, we investigated the production route and production cross-section of few non-standard radionuclides ( $^{55}\text{Co}$ ,  $^{61,64}\text{Cu}$ ,  $^{66,68}\text{Ga}$ ,  $^{86}\text{Y}$ ,  $^{89}\text{Zr}$ ,  $^{90}\text{Nb}$ ,  $^{94}\text{mTc}$ ) using medium energy proton and alpha beams. Stacked-foil activation technique was applied to irradiate the samples (natNi, natFe, natCu,  $^{89}\text{Y}$ ,  $^{93}\text{Nb}$  and natMo) with external beam of MC-50 cyclotron installed at Korea Institute of Radiological and Medical Sciences (KIRAMS), Korea. Off-line  $\gamma$ -ray spectrometric technique was used for spectrum analysis and measurement of production cross-sections of radionuclides of interest. Based on the cross-section, thick target yield information was also obtained. We studied natNi(p,x) $^{55}\text{Co}$ , natFe(p,x) $^{55}\text{Co}$ , natCu( $\alpha$ ,x) $^{61,64}\text{Cu}$ , natCu( $\alpha$ ,x) $^{66,68}\text{Ga}$ , natCu(p,x) $^{61,64}\text{Cu}$ ,  $^{89}\text{Y}$ (p,x) $^{86}\text{Y}$ ,  $^{89}\text{Y}$ (p,x) $^{89}\text{Zr}$ ,  $^{93}\text{Nb}$ (p,x) $^{90}\text{Nb}$ ,  $^{89}\text{Y}$ ( $\alpha$ ,x) $^{90}\text{Nb}$ ,  $^{93}\text{Nb}$ ( $\alpha$ ,x) $^{94}\text{mTc}$  and natMo(p,x) $^{94}\text{mTc}$  reactions in the energy range from their threshold to 45 MeV. Proton and alpha beams were bombarded on different targets to investigate the production routes and production cross-sections of different radionuclides. However, chemical separation of these non-standard PET radionuclides or their application to image biological systems was not studied. Stacked-foil activation technique was applied to irradiate the sample with external beam of MC-50 cyclotron installed at Korea Institute of Radiological and Medical Sciences, Korea. Thin metallic foils (10-50 nm) of  $1\times 1$  cm<sup>2</sup> area were placed in front of beam of 10 mm diameter (100-200 nA current) to irradiate for 0.5-1 hours depending on the experimental setup. Off-line  $\gamma$ -ray spectrometric technique was used for spectrum analysis and measurement of production cross-sections of produced radionuclides. Besides aforementioned reaction products, some other short lived non-standard PET radionuclides were also produced but their production could not be identified due to their very short half-lives. As the produced radioisotopes are medically important, therefore, the integral yields for thick target of the investigated radio-nuclides were also calculated from the measured excitation functions. The measured results were compared with the literature data as well as with the theoretical values obtained from the TENDL-2015 library based on the TALYS 1.8 code. The study of the production of non-standard PET radionuclides from different reactions describes the cross-sections and yield information in the energy range of 2-45 MeV. Most of the reaction products are directly produced so chances of contamination and unwanted impurities are minimum. One of the advantages of this technique is carrier free production of desired radioisotopes and easy separation through chemical process. We did not investigate the methods to separate chemically the desired radionuclides and their applications to image biological systems. However, based on our study the best production route and suitable energy for maximum production can be identified to produce the desired radionuclide in the economical way. Though the study has been provided by other investigators, yet discrepancies were observed in their measurements, so the current study is enough to enrich the literature data except a few where further investigations are required to make the production economically viable. The information provided about integral yield is pertinent for those involved in radioisotope production.

phy.knu@gmail.com

2<sup>nd</sup> World Congress on

# RADIOLOGY AND ONCOLOGY

July 16-17, 2018 Dubai, UAE

## Evaluation of a commercial orthopedic metal artefact reduction tool in radiation therapy

Maria Elena Morales Landin  
University of Trieste, Italy

**Introduction & Aim:** Computed Tomography images in radiation therapy are used to localize the Planning Target Volume (PTV), the Organs at Risk (OARs) and calculate the dose distribution by Treatment Planning System (TPS). Image artifacts could lead either a wrong definition of structure contours by the clinician either an erroneous computation of dose due to inaccuracies in the Hounsfield Unit (HU) values. Radiotherapy patients often have metal implants and this causes several image artifacts. This study focused on the advantages using a commercial metal artifacts reduction algorithm, O-MAR (Philips Healthcare System, Cleveland, OH) and its effect on dose calculation.

**Methods & Materials:** The study five head and neck cases were considered with metal dental implants. Patients were scanned on a large bore CT Brilliance Philips. The scanned images were reconstructed with standard and O-MAR algorithm for each patient. The structures drawing by the clinicians on the O-MAR series were copied on the originally CT images to evaluate the dose distribution on the same volume. Plans were performed on Pinnacle TPS with Intensity Modulated Radiation Therapy Technique (IMRT). The treatment provided two or three PTVs respectively with 54/66 Gy and 54/60/66 Gy and dose were evaluated on different OARs, close to the artifacts region, such as bone marrow, parotids and mandible. Hounsfield units variation was analyzed also in additional Region of Interest (ROI) near the dental implant.

**Results:** In OMAR images, noise value is reduced and standard deviation of HU is lower than in standard reconstructed images. Statistical analysis on HU values was performed, but no significant difference between the two data sets was founded. Evaluating the dose distribution and the Dose Volume Histogram (DVH) with the physicians, no significant differences were detected by a clinical point of view.

**Conclusion:** In head and neck case, when patients have dental implants, the use of O-MAR improve the entire radiation treatment planning process, especially for contouring because increase the accuracy of CT HU and reduce the noise. No significant changes in dose calculation were found.

toyoco3000landin@hotmail.com

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# RADIOLOGY AND ONCOLOGY

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## Biphasic and triphasic computed tomography scan in focal tumoral liver lesions

Waseem Zafar, Zain Zulfiqar, Basit Iqbal, Najam Ud Din and Sohail Murad  
Medcare International Hospital, Pakistan

**Objective:** To assess the diagnostic accuracy of biphasic and triphasic spiral CT in differentiating benign from malignant focal tumoral liver lesions in the patients of Gujranwala region.

**Method:** The study was conducted in the Department of Radiology of Medcare International Hospital and GINUM cancer hospital, Gujranwala from 11 March 2015 to December 2015.

**Result:** Among 60 patients, 108 liver lesions (12 benign and 96 malignant) were detected with the help of different enhancement patterns. Out of these, 37 (82.2%) patients had malignant while 8 (17.8%) had benign lesions. 96 (88.8%) of the total 60 cases had malignant lesions while 12 (11.1%) were diagnosed as benign lesions.

**Conclusion:** Biphasic and triphasic CT scan is a good non-invasive tool in characterizing and differentiating benign from malignant liver lesions.

waseem\_mt@yahoo.com

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# RADIOLOGY AND ONCOLOGY

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## Clinical importance of circulating EGFR mRNA expression in non-small cell lung cancer patients

Mirza Masroor Ali Beg<sup>1</sup>, Prasant Yadav<sup>1</sup>, Alpana Saxena<sup>1</sup> and Anant Mohan<sup>2</sup><sup>1</sup>Maulana Azad Medical College, India<sup>2</sup>All India Institute of Medical Sciences, India

**Background:** Non-Small Cell Lung Cancer (NSCLC) is a disease involving uncontrolled cell growth, which could result in metastases into nearby tissues beyond the lungs. The molecular mechanisms involved in NSCLC are still relatively unknown and are being investigated extensively.

**Materials & Method:** Present study aimed to analyze the importance of Epidermal Growth Factor Receptor (EGFR) gene expression on metastasis and survival in Indian NSCLC patients. The present case-control study included 100 cases of NSCLC patients and 100 age- and sex-matched controls. EGFR gene expression was analyzed by quantitative real time PCR using serum RNA. Association with NSCLC patient survival was analyzed by the Kaplan-Meier method.

**Result:** We analyzed circulating EGFR gene expression and observed mean increased gene expression of 13.5-fold in NSCLC patients. Patients in stage-1 showed 4.07-fold increased EGFR gene expression, stage-2 showed 7.08-fold increased gene expression while in stage-3 and 4 showed 14.81 and 18.35-fold increased gene expression respectively ( $p < 0.0001$ ). Patients with distant organ metastases had 18.35-fold increased gene expression compared to without metastases had 9.86-fold increased gene expression ( $p < 0.0001$ ). Values reflected overall survival of patients with a median of 15.8 months in the cases of  $< 13$ -fold increased gene expression vs. 6.7 months with  $> 13$ -fold increased EGFR gene expression ( $p = 0.005$ ). Distant metastatic patients with  $< 13$ -fold increased EGFR gene expression had 7.9 months of median survival time while  $> 13$ -fold increased EGFR gene expression had only 5 months of median survival time ( $p = 0.03$ ). Non-metastatic patients with  $< 13$ -fold increased EGFR gene expression had 18 months of median survival time as compared to only 7.1 months with  $> 13$ -fold increased expression.

**Conclusion:** Higher circulating EGFR mRNA expression may play an important role in cause of distant metastases and decreased overall survival of NSCLC patients in the Indian population.

mirzamasroor1986@gmail.com

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# RADIOLOGY AND ONCOLOGY

July 16-17, 2018 Dubai, UAE

## Imaging of ring enhancing brain lesions: A systematic approach and the impact of advanced imaging modalities

**Heba Ibrahim Ali**

Ain Shams University Specialized Hospital, Egypt

Ring-enhancing intracranial lesions are common and puzzling diagnostic dilemma and still a challenge to characterize even with the use of MRI. Routine brain MR imaging is very sensitive in the identification of ring enhancing lesions, but it lacks some specificity, for instance it cannot distinguish between neoplastic and non-neoplastic lesions, in a large percentage of these cases. Frequently, the differentiation of a tumor from an infection is quite difficult, based solely on conventional MRI. Therefore, advanced MR techniques as proton Magnetic Resonance Spectroscopy (1H-MRS), Perfusion-weighted imaging and Diffusion Tractography Imaging (DTI) have been employed in the differential diagnosis of these lesions with variable success rates. The purpose of this presentation is establishing a systematic approach to examine intracranial ring enhancing lesions and to verify the role of advanced MRI techniques in the differential diagnosis.

hebaali\_m@hotmail.com

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