

diffusion weighted imaging (DWI). Three-dimensional imaging with a T1-weighted spoiled gradient-echo sequence was performed for contrast enhanced sequences. Special protocols have been developed for patients with different breast pathology and breast implants, allowing for a shorter imaging time.

**Conclusion:** Breast MRI is a useful modality for detailed evaluation of breast lesions. An awareness of proper imaging techniques can be useful for adjusting technical factors and applied sequences to the clinical setting as well as for shortening the imaging time.

## EVALUATION OF SPINAL INSTABILITY USING EOS X-RAY IMAGING SYSTEM: ONE OF THE LATEST TECHNOLOGY ADVANCEMENTS

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**Introduction.** Spinal instability is commonly used to describe greater than normal range of motion (or “hypermobility”) between two vertebral segments that results in pain or compromised neurologic function. The condition is often linked to degenerative changes in the spine; however, the diagnosis frequently poses a variety of challenges as the pain can be caused by a variety of other factors. Furthermore, establishing a distinct cause relationship between spine mobility and pain in many patients may prove nearly impossible. EOS X-ray imaging system is a low-dose, 3D imaging system manufactured by EOS imaging (formerly known as Biospace Med, Paris, France). The imaging system relies on the high sensitivity of a special detector (a multi-wire chamber invented by Georges Charpak, for which he was awarded the 1992 Nobel Prize) to produce high-quality images with less irradiation than standard imaging techniques. While EOS imaging may have many potential applications, it has been reported as being most useful in relation to those conditions that require imaging that is weight-bearing, full body, simultaneous postero-anterior and lateral, three-dimensional (3D), and/or where radiation exposure is a concern.

**Aim.** In this study we aimed to evaluate the spinal instability in a cohort of patients who underwent both whole spine static imaging and functional probes (posterior — anterior and lateral mobility assessment) using an EOS X-ray imaging system.

**Material and methods.** The study included 114 patients (82 females and 32 males) aged 18-60 years old with suspected spinal instability. All patients underwent whole spine static imaging as well as functional probes consisting of flexion–extension and side-bending X-rays for posterior — anterior and lateral mobility assessment using an EOS X-ray imaging system. The data were correlated with clinical symptoms and available clinical records.

**Results and discussion.** The static images revealed morphological changes consistent with lumbar spine instability in 93 from 114 (81.6%) patients. From these, 55 (59.1%) patients and changes consistent with cervical spine instability in 21 from 114 (18.4%) patients. A total of 55 from 93 (59.1%) patients with detected lumbar spine instability on static images demonstrated additional abnormalities on functional probes involving posterior — anterior and lateral mobility assessment.

Abnormal functional probes showed also a good correlation with reported clinical symptoms, suggesting that EOS imaging represents a suitable modality for evaluating patients with suspected spinal instability. Other common indications may include kyphosis, scoliosis, deforming dorsopathies and congenital deformities of the spine, hips or lower extremities. Reducing radiation dose may be particularly beneficial for children who need to be imaged frequently, such as children with spinal deformities. Thus, EOS delivers a radiation dose that is 6 to 9 times less than a standard X-ray film and 20 times less than a basic computed tomography scan. The technique allows capturing simultaneous frontal and lateral head-to-toe images of patients in the upright, weight-bearing position with an outstanding image quality. True to size images (1:1 scale) for surgical planning and monitoring of bone and joint diseases can be also obtained. Although EOS imaging is considered by many users to be the future gold standard of X-ray imaging of the skeleton due to its many advantages (mainly 3D reconstruction with a low radiation dose), it should be remembered that the modality is not currently used for assessing injuries or conditions that can be evaluated with general radiography, such as bone fractures, evaluation of lung nodules or examinations involving fluoroscopy, angiography, and mammography. Traditional X-rays are still the standard of care in such situations.

**Conclusion.** The study demonstrated that EOS X-ray imaging represents a suitable modality for evaluating patients with suspected spinal instability. Functional probes involving posterior — anterior and lateral mobility assessment obtained by this system provide additional information and show a good correlation with clinical symptoms. In the Republic of Moldova this is the first EOS X-ray imaging system — its impact on the quality of radiology and medical imaging services is still under evaluation and this may become more evident in the coming years.

## IMAGING OF BREAST IMPLANTS: ABNORMAL FINDINGS REVEALED BY BREAST ULTRASOUND AND CONTRAST ENHANCED BREAST MRI

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**Introduction.** With the evolution of implant devices and surgical options, the radiologists are facing new challenges related to the diagnosis of implant-related complications.

**Aim.** The study aimed to assess the role of breast ultrasound and magnetic resonance imaging (MRI) in the evaluation of patients with breast implants.

**Material and methods.** The study included 19 consecutive female patients who presented for evaluation of their breast implants and underwent both breast ultrasound and breast MRI examinations. The findings were reported according to the Breast Imaging Reporting and Data System (BI-RADS) classification.

**Results and discussion.** Contrast enhanced MRI revealed a higher number of breast abnormalities (42.1% exams ranking as BI-RADS II category and 10.5% as BI-RADS III category) compared to breast USG

(31.6% exams ranking as BI-RADS II category and none as BI-RADS III category or higher). Findings revealed only by breast MRI were most commonly related to local fibrocystic changes or fibroadenomatoid mastopathy (FAM). A breast hamartoma (fibroadenolipoma) in one patient was also detected only by breast MRI. Breast MRI proved also useful in revealing implant ruptures in a higher number of patients compared to breast USG. Thus, extracapsular implant ruptures were revealed in 26.3% of patients by breast MRI versus only in 15.8% patients by breast USG. An intracapsular implant rupture in one patient could be also revealed only by breast MRI.

**Conclusions.** Breast MRI represents the modality of choice for evaluation of implant integrity and associated pathology in symptomatic patients. It can also provide additional information in patients with breast implants and persisting symptoms despite negative USG findings.

#### DIFFERENTIAL DIAGNOSTIC CRITERIA OF DIFFUSE PARENCHYMAL LUNG DISEASES BASED ON CASE STUDIES

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**Introduction.** Today diffuse parenchymal lung diseases refer to the list of some 200 entities which typically affect both lungs in an acute, subacute or chronic manner and overlap in their clinical, imaging, physiologic and pathologic manifestations. The most common causes of diffuse parenchymal lung diseases are occupational and environmental exposures, and other causes include granulomatous disorders, inhalational diseases, eosinophilic lung disease, various metabolic and miscellaneous disorders. Some of diffuse parenchymal lung diseases are of unknown etiology. The frequent asymptomatic early course of disease despite the presence of extensive parenchymal abnormalities on chest radiographs, or, on the contrary, the normal chest radiograph in 10% of affected patients; in other cases, the overlap of radiographic patterns require HRCT/CT analysis to narrow the list of differential diagnostic consideration and must be correlated with clinical and pathologic features to achieve a multidisciplinary assessment in evaluating the patients.

**Aim.** On the basis of the case studies to assess the X-ray film data and results of spiral computed tomography (SCT), to analyze them by comparing clinical and laboratory data and to form the differential diagnostic approach.

**Materials and methods.** Patient study: the clinical and imaging data of 56 patients at the age from 24 to 69 (39 men and 17 women) was analysed. All patients underwent chest radiograph without additional HRCT. In 46 cases HRCT was performed and in 14 patients the HRCT with contrast enhancement was performed. The imaging analysis included the following criteria:

1. The presence of diffuse parenchymal lung disease, anatomic distribution of imaging pattern and patterns' type.
2. Regional distribution of diffuse parenchymal lung disease.
3. The presence of fibrotic changes and destruction sites.
4. Dynamics of disseminated process in follow-up.

**Results and discussions.** In 30 cases the false diagnosis was established and non-effective therapy was conducted forcing to review differential diagnostic consideration. In three cases the non-specific treatment refuted the relapse of oncopathology. In 23 cases at the early diagnostic stage diagnosis was established immediately or over time based on histology.

The nodules localization, size, the dynamics of radiological patterns, the disease clinical manifestation, occupational history etc were assessed.

Acute hematogenous disseminated tuberculosis is characterized by randomly distributed uniform nodules bilaterally, symmetrically or diffuse combined with strongly pronounced clinical manifestation of inflammatory process.

Sarcoidosis is characterized by epithelioid granulomas which spread along the lymphatic routes in the early stages (along the bronchovascular bundles, in the interlobular septa and subpleural) and diffuse in the advanced stages; bilaterally, predominantly central, especially dorsal in upper lung regions.

The smooth, nodular or nodular reticular pattern of the interstitium is typical for carcinomatosis with central peribronchovascular, centrilobular, septal and/or subpleural localization and variable (monolateral, bilateral, patchy) distribution.

Langerhans' cell histiocytosis is characterized by high-density centrilobular nodules with well-defined margins and irregular borders; cavitation is common. The number of nodules may vary from very few to a multitude with bilateral and symmetrical upper and middle lung zones distribution.

**Conclusion.** The chest radiograph remains the first imaging study used in evaluating patients with diffuse parenchymal lung disease. The HRCT is recognised to be the additional imaging modality in differential diagnostic consideration. But despite the increased accuracy of HRCT and correlation of imaging findings with clinical data, the final verification of the process using lung biopsy shows the most accurate and effective manner of evaluating the patients.

#### MAYER-ROKITANSKY-KUSTER-HAUSER SYNDROME: ROLE OF PELVIC MRI FOR INITIAL DIAGNOSIS AND PREOPERATIVE EVALUATION

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**Introduction.** Mayer-Rokitansky-Kuster-Hauser syndrome (MRKHS) is a disorder that occurs in females and is characterized by absent or rudimentary uterus and the upper part of the vagina. Affected women usually do not have menstrual periods due to the absent uterus. The patients have a female chromosome pattern (46, XX) and normally functioning ovaries. Since the lower part of the vagina is developing from the urogenital sinus along with the bladder and urethra, this can be present even when the Mullerian duct is completely absent. The condition may be isolated (type I) or associated with other malformations (type II or MURCS association) such as vertebral, urologic, cardiac, and otologic anomalies.