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HIP BEFORE AND AFTER TOTAL HIP REPLACEMENT X-RAY OF THE JOINT

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Abstract
Injuries and diseases of the musculoskeletal system are the second leading cause of disability and the third leading cause of death. According to WHO forecasts, the number of patients with this pathology will increase, which is associated with an increase in the average life expectancy of the population. In modern traumatology and orthopedics, great importance is attached to the pathology of large joints, in particular, the hip joint. The problem of treating patients with diseases and injuries of the hip joint is not only medical, but also socio-economic in nature.

Keywords: Endoprosthesis, hip joint, radiology, radiography.

Introduction

The development and introduction into clinical practice of high-tech methods of surgical treatment of patients in modern traumatology and orthopedics is a priority.[1].One such method is hip replacement surgery. This operation is performed on patients with various pathological changes in the joint.Hip replacement is performed in cases of femoral neck fracture, aseptic necrosis of the femoral head, joint dysplasia, deforming osteoarthritis, rheumatoid arthritis, and other conditions.[2].

Endoprosthesis is a modern radical and most effective method of surgical treatment of diseases and injuries of the hip joint. As a result of this treatment, most patients quickly regain pain-free mobility and support in the operated joint, which significantly improves the quality of life of patients.[3].

Despite the use of a number of methods of hip replacement using various endoprosthetic designs from domestic and foreign manufacturers, the results of these operations are not always positive today. Among the complications in the immediate and long-term postoperative period, aseptic instability and

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paraprosthetic fractures are in the first place. Standard follow-up of hip replacement begins with radiography, with visual assessment of the hip replacement[4].It provides clinical information about the condition of the prosthesis and the adjacent bone. However, a number of unresolved problems remain. Thus, the interaction of radiologists and orthopedic traumatologists in the preoperative examination is insufficient. In the postoperative period, radiographs are performed only in the right projection (axial images are rarely taken), and control CT scans are not performed.[5-6].The degree of structural changes in the bone during the rehabilitation period is not assessed, the optimal timing of control X-ray examinations has not been determined. The radiological semiotics reflecting bone disorders and the state of the endoprosthesis have not been clearly defined. A systematic approach to the selection of radiodiagnostic methods for assessing changes in the hip joint before and after endoprosthesis has not been developed. [7-8].

Recently, more and more scientific works have been appearing in which the authors propose the simultaneous use of various light methods to analyze the condition of joints and paraarticular structures.[9].

Purpose of the study The aim is to improve the systematic approach to radiological diagnostics in degenerative diseases before and after endoprosthetics.

Methods and materials of the study. The results of clinical, laboratory and radiological examinations of 40 patients with coxarthrosis of the hip joints requiring endoprosthesis were analyzed.

Results of the study. To solve the tasks set, the results of clinical, laboratory and radiological examinations of 40 patients with hip joint pathology who were treated as inpatients at the "STAR ORTHOMED" round-the-clock clinic and who underwent planned treatment at the Bukhara branch of the Republican Emergency Ambulance Center from 2018 to 2021 were analyzed. All patients underwent total hip joint replacement. Patients were selected for observation groups according to certain criteria.

Dysplastic coxarthrosis, aseptic necrosis, and hand-like remodeling of the bones forming the hip joint with significant functional impairment and pain syndrome

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were the criteria for inclusion of patients in the study group. Patients with fractures of the femoral head and neck and fractures of the acetabular cup constituted a small percentage of the examined patients. The distribution of patients by age is presented in Table 1.

Table 1 **Age distribution of examined patients, n= 40**

Age	**Number of patients**	
	Abs.	%
20-30	2	5
31-40	8	20
41-50	18	45
51-60	10	25
Over 60 years old	2	5
Total	40	100

As can be seen from the data presented in the table, among the 40 patients, there were 15 men (37.5%) and 25 women (62.5%) aged 20 to 70 years. The average age of the patients was 52.5 ± 4.9. Patients aged 41 to 50 years predominated in the study group.

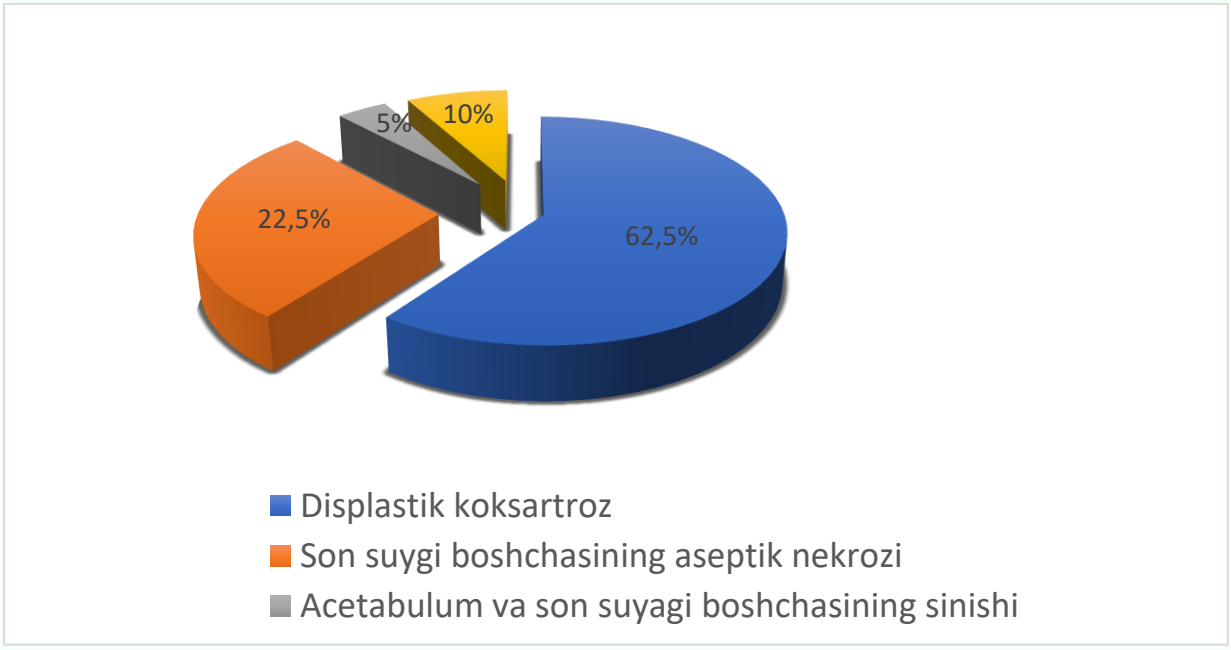

Figure 1. Distribution of patients by etiology of pathological changes in the hip joint, n=40.

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As can be seen from the presented diagram, the largest part of the study group was made up of patients with dysplastic coxarthrosis of the hip joint (n = 25 (62.5%), which indicates the social importance of the problem of treating degenerative processes of large joints. The percentage composition of patients by disease symptoms is as follows:

1. Aseptic necrosis of the femoral head was detected in patients (22.5%).
2. Patients with femoral neck fractures were identified in 2 cases, accounting for 5%.
3. Femoral head and acetabular fractures were observed in 4 patients (10%).

The studies used clinical, laboratory and radiological research methods.

Before and after hip arthroplasty, patients underwent digital radiography in the frontal and lateral projections, and multispiral computed tomography (MSCT) during the radiographic examination phase.

Table 2 **Conducting radiographic examinations before and after endoprosthetics**

Pathologies	**Before surgery**		**After surgery**	
	Radiography	**MSCT**	**Radiography**	**MSCT**
Dysplastic coxarthrosis	20	10	20	6
Aseptic necrosis of the femoral head	10	1	10	2
Fracture of the acetabulum and femoral head	3	1	3	1
Femoral neck fracture	7	1	7	2
Total	**40**	**13**	**40**	**11**

We examined and surgically treated 40 patients with pathology of the hip joints. All patients' complaints were analyzed, a clinical examination was performed, and their life and medical history were studied.

Radiographic data from 40 patients and MSCT data from 13 patients were analyzed. The shape and relationship of the articular ends of the bones, their surface, and the structure of the bone tissue were studied on radiographs of the iliofemoral joint in 2 projections, as well as on computed tomograms.

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The bone structure over the acetabular area was visible on plain radiographs. The bone structure was less evident in the area covered by the posterior dome and both edges of the cast cup.

Small-scale (1–2 mm) changes in the claw-like structure could not always be detected because the body of the iliac bone was located above the dome of the fossa and had a significant thickness.

The computed tomography was consistent with the X-ray examination in the right projection and did not provide any additional diagnostic information. The peculiarity of this method is that all tissues falling into the section can be scanned layer by layer in the horizontal plane. Multi-planar and 3D image reconstruction was used to identify the upper parts of the femoral heads and the most loaded part of the acetabular cup.

Image: 2 Radiograph (a) and resected proximal femur (b) of patient L., 60 years old, with a femoral neck fracture.

In dysplastic deforming osteoarthritis, incomplete closure of the femoral head, curvature and densification of the cup dome were detected. In valgus deformity, the femoral head acquired a mushroom shape and a shortened neck was observed.

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Anatomical changes in the acetabular and proximal femoral condyles caused by dysplasia resulted in a disruption of the relationship in the iliofemoral joint due to upward and outward displacement of the femur (18.0±8.5 mm).Anatomical changes in the acetabular and proximal femoral condyles caused by dysplasia resulted in a disruption of the relationship in the iliofemoral joint due to upward and outward displacement of the femur (18.0±8.5 mm).

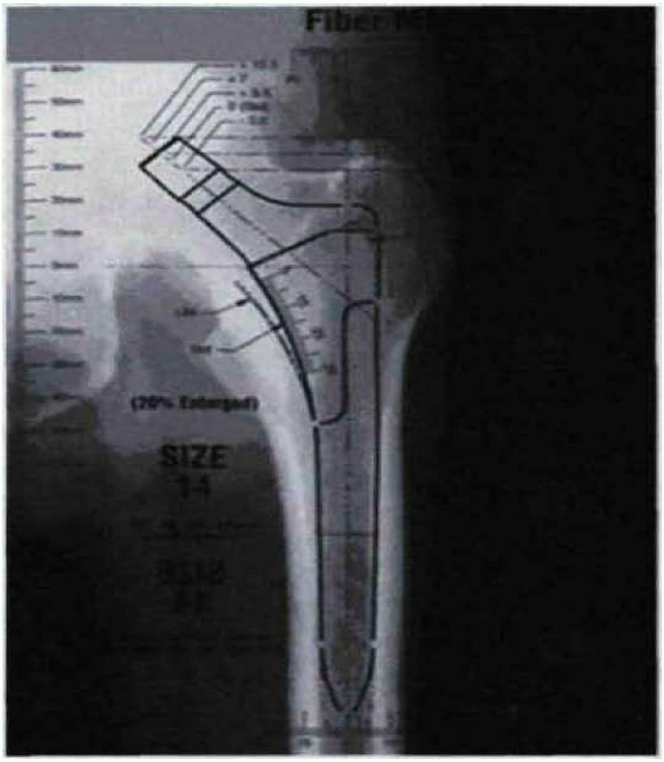

Figure 3. Preoperative planning based on radiographs using templates.

The results of a comparative assessment of the capabilities of radiological methods (digital radiography and MSCT) in detecting changes in the hip joint in coxarthrosis are presented in Table 3.

According to the data presented in the table, no significant differences were found in the indicators characterizing the capabilities of MSCT and digital radiography. The use of MSCT made it possible to see smaller cysts (up to 2 mm in diameter) and smaller areas of sclerosis (up to 5 mm).

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Table 3 Radiological signs of deforming arthrosis of the hip joint

Radiological signs	**radiography** n \u003d 40		**MSCT** **n \u003d 13**	
	ABS.	*%*	ABS.	*%*
Subchondral sclerosis	40	100	13	100.0
small areas of sclerosis (up to 5 mm)	25	65.5	10	77
x-ray reduction of articular fissure height	40	100	10	77
loss of articular cartilage	8	20	3	23
change the shape of the femoral head	40	100	13	100.0
Small subchondral cysts (up to 2 mm in diameter)	0	0	10	77
Medium to large sized Subchondral cysts (3-15 mm in diameter)	30	75	12	92
small marginal osteophytes (up to 2 mm)	0	0	5	38
Medium to large marginal osteophytes (3-15 mm)	40	100	13	100.0
change the angle of vertical inclination of the acetabulum	2	5	1	7
changes in the femoral head	2	5	1	7
anteversions 2 5 1 7 acetabulum shape	2	change 2 5	1	7
change (CDU)	13	32.5	3	23

Conclusion

1. The study investigated the role and potential of X-rays and MSCT in the diagnosis of changes in the hip joint before endoprosthetics. With the help of MSCT, the diagnosis of severe injuries of the hip joint becomes more accurate, therefore, the sensitivity, specificity, accuracy, positive and negative predictive values (100%, 88%, 98%, 94%, 100%, respectively) exceeded the values calculated for radiography (73%). , 83%, 76%, 87%, 65%).
2. The complex use of radiological methods allowed to identify and complete the semiotics of bone tissue at the level of the proximal femur and the cast cup after arthroplasty. The sensitivity, specificity, accuracy, positive and negative prognosis of MSCT (81%, 84%, 71%, 92%, 67%) exceeded those calculated for radiography (71%, 82%), 61%, 91%, 64%), but not significantly.
3. MRI is diagnostically superior to ultrasound. The effectiveness of MRI in diagnosing meniscal injuries was: sensitivity 94.8%, specificity 87.5%, cruciate ligaments accuracy: 93.4%, injury sensitivity 94.5%, specificity 95.8%, accuracy 95%.

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