



Etiology of coxarthrosis in patients with total hip replacement

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Objective: We aimed to find out the distribution of etiological factors in patients who had total hip replacement for coxarthrosis.

Methods: The medical records of the 965 hips of 886 patients operated with total hip replacement between 2001 and 2012 in two separate arthroplasty clinics were analyzed by two separate senior surgeons. Each patient's pre- and postoperative X-rays and demographic data such as gender, age, side and probable etiologic factors were noted.

Results: Six hundred and eighty-four patients were women and 202 were men. The mean age were 62.7 ± 14.3 (range: 16 to 91) in women, 58.8 ± 17.1 (range: 25 to 91) in men. 52.1% of the surgeries were performed on the right side, 39% on the left, and 8.9% bilaterally. In women 36.2% of the cases were primary coxarthrosis, while the etiology was developmental dysplasia of the hip (DDH) in 43.5% of the cases, avascular necrosis in 10%, romatoid diseases in 7%, slipped capital femoral epiphysis in 5%, posttraumatic coxarthrosis in 3.9%, pathologic coxarthrosis in 1.9%, and Perthes sequel in 1.7%. In men, 24.4% of the cases were primary coxarthrosis, while the etiology was avascular necrosis in 21% of the cases, DDH in 17.6%, posttraumatic coxarthrosis in 16.8%, romatoid diseases in 10.9%, Perthes sequel in 4.2%, slipped capital femoral epiphysis in 2.5%, and pathologic coxarthrosis in 2.5%. The most common etiologic factor was DDH with a rate of 37.1%.

Conclusion: Despite the heterogeneity of our study population, our results may reflect the distribution of coxarthrosis etiologies in Turkey. Developmental dysplasia of the hip appears to be the most frequent cause of coxarthrosis among the patients undergoing total hip replacement.

Key words: Coxarthrosis; developmental dysplasia of the hip; dysplasia; osteoarthritis; total hip replacement.

Total hip arthroplasty (THA) is one of the most frequent orthopedic procedures in Turkey. However, we neither know the total number of THA operations per year, nor the percentage of the etiologies of coxarthrosis in patients undergoing THA. The aim of this study was to show the preoperative indications of coxarthrosis leading to the total hip arthroplasty. The study was con-

ducted in two separate arthroplasty clinics of Istanbul. Although our data do not comprise the whole country, a city attracting as much immigration from various cities and possessing a heterogeneous population as Istanbul would at least lead us to a general conclusion. We hope that our preliminary results will guide us until the National Registry System's establishment.

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Patients and methods

The medical records of the 965 hips of 886 patients operated with total hip replacement between 2001 and 2012 in two separate arthroplasty clinics were analyzed by two separate senior surgeons. Each patient’s medical history, pre and postoperative X-rays and demographic data such as gender, age, side and probable etiologic factors were noted. Three references, were used during the interpretation of the pre-operative X-rays for the etiology of coxarthrosis.^[1-4] Femoroacetabular impingement or high body mass index or femoral/acetabular version anomalies were considered as primary coxarthrosis. Slipped capital femoral epiphysis (SCFE) was diagnosed based on “Murray’s tilt deformity”. A central-edge angle lower than 25 degrees, and Sharp angle higher than 40 degrees, and decrease in the acetabular depth and full dislocation of femur head were the criteria for developmental dysplasia of the hip (DDH). Coxarthrosis secondary to DDH sequel, Perthes sequel and rheumatoid disorders, pathological coxarthrosis and posttraumatic osteoarthritis were assigned based on the patients’ history on the records. Patients with missing data and te ones with no consensus on the etiology of coxarthrosis were excluded from the study. SPSS v.20 program (SPSS Inc., Chicago, IL, USA) was used for the statistical analysis.

Results

Six hundred and eighty-four (75.3%) patients were women and 202 (24.7%) were men (Table 1). The mean age were 62.7±14.3 (range: 16 to 91) in women, 58.8±17.1 (range: 25 to 91) in men. 52.1% of the surgeries

were performed on the right side, 39% on the left, and 8.9% bilaterally. In women 36.2% of the cases were primary coxarthrosis, while the etiology was DDH in 43.5% of the cases, avascular necrosis (AVN) in 10%, romatoid diseases in 7%, SCFE in 5%, posttraumatic coxarthrosis in 3.9%, pathologic coxarthrosis in 1.9%, and Perthes sequel in 1.7%. In men, 24.4% of the cases were primary coxarthrosis, while the etiology was AVN in 21% of the cases, DDH in 17.6%, posttraumatic coxarthrosis in 16.8%, romatoid diseases in 10.9%, Perthes sequel in 4.2%, SCFE in 2.5%, and pathologic coxarthrosis in 2.5% (Table 2). The most common etiologic factor was DDH with a rate of 37.1% (Table 3).

When age is considered, the most frequent age interval for THA operation was found to be 50-52 and 70-72 years. While etiologies in younger ages were identified as AVN and DDH, primary osteoarthritis was the most common ethology in older ages. 148 Patients (15.3%) were operated bilaterally.

Discussion

Total hip arthroplasty (THA) is one of the most frequent orthopedic procedures in our country. However, we neither know the total number of THA operations in Turkey per year, nor the total percentage of indications for total hip arthroplasty. The aim of this study was to show the preoperative indications of coxarthrosis leading to total hip arthroplasty.

The majority of the patients who underwent THA were female (75.3%). The main reason of this result was

Table 1. Genders of all patients.

Gender		Incidence	Percentage	Cumulative percentage
Female	Primary osteoarthritis	190	26.2	26.2
	Dysplasia	316	43.5	69.7
	AVN	79	10.9	80.6
	SCFE	36	5.0	85.5
	Perthes	12	1.7	87.2
	Posttraumatic	28	3.9	91.0
	Rheumatic	51	7.0	98.1
	Pathological	14	1.9	100.0
	Total	726	100.0	
Male	Primary osteoarthritis	58	24.4	24.4
	Dysplasia	42	17.6	42.0
	AVN	50	21.0	63.0
	SCFE	6	2.5	65.5
	Perthes	10	4.2	69.7
	Posttraumatic	40	16.8	86.6
	Rheumatic	26	10.9	97.5
	Pathological	6	2.5	100.0
	Total	238	100.0	

AVN: Avascularlr necrosis, SCFE: slipped capital femoral epiphysis

probably the high incidence of DDH among women.^[5,6] Even though according to a recent, multi-centric study performed in Turkey men was found to have a higher tendency for hip dysplasia; our study showed that DDH is more frequent among women.^[7] This conflicting result may be due to the improvements in the screening and treatment of DDH in our country.

Developmental dysplasia of the hip was the most common etiology. One explanation behind this is probably the ease of diagnosis of Crowe Type 3 and 4 hips and availability of medical records on DDH treatment.^[8] DDH, with its incidence as high as 6% can be regarded as an “endemic” disorder in our country. While it was formerly more common in Black Sea region; it is now, possibly due to immigration, more common country-wide.^[7] The mean age of the patients with Crowe Type 1 and 2 hip dysplasia, without dislocation was found 59.3 (range: 24 to 89). Sixty-three percent of the patients were above that average age. These results suggest that the recent improvements in the diagnosis and treatment of DDH may prevent the development of coxarthrosis. We can then conclude that with the widespread use a standardized physical examination, sonographic screening and timely interventions the rate of secondary coxarthrosis is expected to decrease.

Primary osteoarthritis was the second most frequent etiology. Femoroacetabular impingement syndrome and version disorders were considered in this group.^[9] Even though the femoroacetabular impingement syndrome is now an independent etiological factor for secondary coxarthrosis,^[9] during the implementation of our study, based on our major references, we included this entity in the primary osteoarthritis category. The high rate of primary coxarthrosis may be due to this accumulation.

Even though primary osteoarthritis is considered as the most frequent etiology for coxarthrosis, our study showed it as the second frequent cause in the whole

Table 2. Etiological factors of each gender.

	Incidence	Percentage
Male	238	24.7
Female	727	75.3
Total	965	100.0

group, albeit being the most common one within men. This can be due to incompetent interpretation of the X-rays or medical records, thus missing the secondary etiological factors.^[10]

Total hip arthroplasty was performed most frequently within the age intervals of 50-52 and 70-72. While AVN and DDH are the most common etiologies in early ages, it is found that primary osteoarthritis was more common in older ages. These results were consistent with the ages of having the THA as a treatment for primary and secondary osteoarthritis.^[11-14]

In our series 57% of the patients were operated from the right hip, a data consistent with the previous reports.^[4-15] However, what is noteworthy is the fact that only 15.3% of the hips (74 patients) were operated bilaterally. While you consider the high rate of primary coxarthrosis and secondary coxarthrosis secondary to DDH in our series (62.8%), both of which are expected to affect both hips, the 15.3% is a relatively low rate for bilateral surgeries.^[4-16] This may be due to the lack of satisfaction after the first operation and changing the hospital for the other hip surgery.

Even though our study comprise a heterogeneous patient profile and embrace approximately 10 years, the identification of the etiology in only 965 hips within a country, which possesses a population of 74 million people, will only provide us with a general information. Moreover, it is difficult to determine a definite etiological factor albeit having two experienced orthopaedic surgeons’ consensus and a medical file review. It should be known that, for the majority of the

Table 3. Etiological factors of the whole population.

	Incidence	Percentage	Cumulative percentage
Whole population			
AVN	130	13.5	13.5
Dysplasia	358	37.1	50.6
Pathological	20	2.1	52.6
Perthes	22	2.3	54.9
Posttraumatic	68	7.0	62.0
Primary osteoarthritis	248	25.7	87.7
Rheumatic	77	8.0	95.6
SCFE	42	4.4	100.0
Total	965	100.0	

AVN: Avascular necrosis, SCFE: slipped capital femoral epiphysis

late-phase osteoarthritis patients, it is impossible to decide on a definite etiology just by looking at their most recent X-rays. During the evolution of osteoarthritis development of AVN and the damage caused by repetitive traumas may obscure the primary etiological reason.

Our study could at least be an initiation for the countrywide multi-centric studies on the etiology of coxarthrosis. Thus, we may find out more precisely the factors behind coxarthrosis in own country and upon these factors, we may as well consider some changes in our national health policy in terms of preventive medicine.

Even though our study does not show the etiology of hip osteoarthritis among all the regions in our country, an investigation performed in a city possessing a heterogeneous population as Istanbul provides us general information at least up until an investigation that will comprise the whole Turkey. Still, dysplasia related osteoarthritis is found to be the most frequent etiological factor for coxarthrosis.

Conflicts of Interest: No conflicts declared.

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