

Coxarthrosis on the island of Gotland

Increased prevalence in a rural population

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On the island of Gotland and in the city of Malmö, the prevalence of coxarthrosis was calculated using the hip projections in colon roentgen examinations. The prevalence of coxarthrosis among the Gotland islanders was about twice that of the Malmö urbanites, and the condition became obvious earlier in life.

The population of the local Gotland city of Visby did not contribute to this difference; the difference was entirely due to an increased incidence in the rural population of the island. Heavy labor in conjunction with farming is believed to be the cause of the deviation.

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The island of Gotland has been studied as regards the occurrence of hip fractures, and hip fractures were found to be more frequent here than in Scandinavian urban areas (Johnell and Mellström personal communication). Also, it has been observed that the Gotland residents require more hip surgery. This was believed to be due to a "pent-up" demand, as such surgery came late to the island.

We compared the prevalence of coxarthrosis on the island of Gotland with that of the city of Malmö in southern Sweden.

Material and methods

Gotland is an island in the Baltic Sea that has a population of 55,000. In rural Gotland, the main occupation is farming. Totally, 21,000 of the residents live in the ancient city of Visby, which is a center of culture and commerce, and the only urban area of the island. The island is a much prized summer resort area.

The city of Malmö, with 235,000 residents, is the third largest city in Sweden; it is an industrial and trading center, and is situated across the Sound from Copenhagen. Rather few of the residents of Malmö are, however, employed in heavy industry.

The only hospital on the island of Gotland, and with but a single department of radiology, is located in Visby. All the colon radiographs (barium enema of the bowel) taken between 1979 and 1987 were scrutinized (radiographs taken before 1977 have been destroyed). Only radiographs in which the hip joints could be

properly evaluated were included. If coxarthrosis appeared in several colon radiographs, the age of the patient was recorded at the time of the first colon roentgen examination showing obvious pathology. In those persons who already had a hip prosthesis, the medical charts and records or older radiographs were studied to clarify the diagnosis. Nonresidents were recognized by their national registration number or by the address in the referral, and they were removed from the sample. This selection left 5,420 subjects in the study. Finally, again from the address in the referrals, the residents of the city of Visby could be distinguished from the other islanders.

For comparison, we used data from Danielsson et al. (1984), which were collected in the city of Malmö between 1975 and 1982, and which included 4,027 colon examinations. In the oldest age groups, all the radiographs were used, whereas in the younger age groups, the radiographs were sampled at random.

In both the Malmö and the Gotland group, the diagnosis of coxarthrosis was based on an overtly decreased joint space of < 2 mm, or obvious asymmetry in unilateral cases. Only in a few cases, 4 in the Gotland series, did the hips have very definitive structural changes (juxtaarticular cysts and sclerosis) in which the joint space was not obviously decreased, but they were accepted just the same as being coxarthrotic hips. On the other hand, cases that were classified as secondary on the basis of their radiographic appearance or history were excluded. Twelve cases were discarded from the Gotland series on this account: CDH 4, rheumatoid arthritis 4, physiolysis 1, Perthes' disease 1, and femoral head necrosis 2. In addition, 5 cases were suspected of being caused by

Table 1. Prevalence of coxarthrosis per 1,000 persons

Age	The island of Gotland						The city of Malmö								
	Subjects			With coxarthrosis			Prevalence		With coxarthrosis			Subjects			
	Men	Women	Total	Men	Women	Total		Men	Women	Total	Men	Women	Total		
45-49	124	180	304	1	1	2	6	4	1	1	2	250	250	500	
50-54	136	222	358	3	4	7	19	6	2	1	3	250	250	500	
55-59	160	244	404	2	3	5	12	12	3	3	6	250	250	500	
60-64	246	284	530	7	10	17	43	16	4	4	8	250	250	500	
65-69	294	230	524	17	16	33	63	18	7	2	9	250	250	500	
70-74	276	359	635	19	18	37	59	40	5	13	18	204	250	454	
75-79	228	308	536	24	20	44	82	55	10	9	19	156	190	346	
80-84	134	178	312	5	8	13	42	75	7	5	12	61	100	161	
85-89	47	62	109	5	5	10	92	76	2	3	5	36	30	66	
90-94	10	4	14	0	1	1									

nontraumatic segmental collapse, but were not really distinguishable from coxarthrosis, and were therefore allowed to remain in the study. Inclusion and exclusion criteria were the same for the Gotland and the Malmö study.

One of the authors (BEN) participated in both studies and reviewed almost all the radiographs, as well as all the radiographs that were borderline or presented signs of secondary arthrosis. Indications for a colon roentgen examination were, as far as can be established, very similar in the two data collections. The increasing use of colonoscopy in recent years has not decreased the rate of colon roentgen examinations. Also, the occurrence of colon pathology was similar in the two groups.

Prevalences were compared using chi-square analysis.

Results

In the Gotland population, 167 cases (81 men and 86 women) of primary coxarthrosis were found in the colon radiographs. Thirty cases were of the central type, whereas the remainder were lateral or mixed. In 1 case, there was multiple joint involvement, such as in a DISH syndrome. In respectively 51, 57, and 59 cases, the coxarthrosis was in the right hip, left hip, and bilateral (in both hips).

Only 29 of the cases of coxarthrosis were residents of the city of Visby. Upon comparing the two sets, Gotland and Malmö, the prevalence in Gotland was found to be higher (Table 1; $P < 0.001$). In Figure 1, the data of those afflicted with coxarthrosis have been condensed further. The prevalence of coxarthrosis in

the islanders was not only higher than in the Malmö urbanites, but the coxarthrosis also began to increase earlier in life (Figure 1). At aged 70 years, the Gotland/Malmö risk ratio of contracting coxarthrosis was approximately 2.

Prevalence of coxarthrosis per 1,000 persons

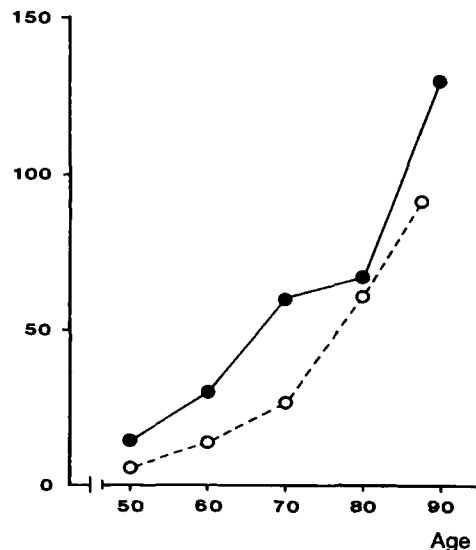


Figure 1. Prevalence of coxarthrosis—a comparison between Malmö (○) and Gotland (●). Data extracted from Table 1. The apparent difference in the oldest age group is not significant.

Discussion

The obvious difficulties in the present study are (1) the error that results when classifying borderline findings and (2) the validity of colon roentgen patients as a population sample. As regards point (1), the error, at least, has been partially controlled, because both groups have been evaluated by the same investigator. As regards point (2), the validity is probably the same in both samples. These two above-mentioned uncertainties could not cause the 2:1 increase in apparent risk.

Although the city of Visby has 38 percent of the population of the island, it contributed only 17 percent of the arthrosis cases; the urbanites of Visby had no more coxarthrosis than those of Malmö. What then is special about the rural part of the island? As mentioned above, it is one of the areas in Sweden where most of the inhabitants are employed in agriculture and agricultural-related industry. Jacobsson et al. (1987) found, in another area of Sweden, that patients with coxarthrosis had more often been engaged in heavy manual labor, particularly driving tractors and lifting heavy loads. In a more recent study, Lindberg and Axmacher (1988) found that only male farmers have an almost tenfold higher risk of contracting coxarthrosis.

In the present study, the distribution of cases among the various subgroups is fairly similar to that reported in other studies: one third had bilateral coxarthrosis, and there was no left- or right-hip preponderance. Although most series of coxarthrosis operations show a preponderance as regards women, the disease was not more common in the female sex in our study, which was also the case in several other reported studies.

It appears that the most important difference in prevalence is in the young and middle-aged groups.

Our data, however, do not permit any conclusions to be drawn about the prevalence of arthrosis in the oldest age groups, because the number of observations is inadequate.

It may well be that coxarthrosis, which is to some extent hereditary (Lindberg 1986), is equally common among the islanders of Gotland as among other Swedes. However, the initiation of the joint-destructive process appears to begin earlier in life in the Gotland residents, and this is believed to be a direct result of the dominating occupation, farming, which will cause more patients to seek an operation for their coxarthrosis.

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