Epidemiology of primary hyperparathyroidism

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Incidence
The incidence has been increasing in many countries since the seventies [1; 2]. In some countries a peak incidence was reached after which the incidence declined to the same levels as were seen before the incidence started to increase [2]. This has been interpreted as the presence of a large "pool" of hitheto undiagnosed mild or asymptomatic patients, who are then diagnosed until the "pool" is emptied and the incidence decreases to the "true" incidence [2]. In Denmark an increase has also been seen, but no peak seems to have been reached [1]. However, the most recent numbers are from 1999, where approximately 250-300 new patients were diagnosed each year [1]. Among the patients approximately 60% underwent surgical treatment, i.e. approximately 150-180 surgeries per year for primary hyperparathyrpoidism [1]. In 2004 a total of approximately 350 parethyroid surgeries were performed in Denmark including surgical treatment of secondary hyperparathyrpoidism in patients with uremia (http://www.sst.dk/Indberetning%20og%20statistik/Sundhedsdata/Download_sundhedsstatistik/Planmateriale/LPR/DSNS.aspx).
In the US between 23% and 50% [3] of patients undergo surgery, i.e. considerably less than in Denmark, probably due to more with mild disease.
In Denmark the incidence among women as increased more than in men [1] leading to a larger percentage of patients being women over time. Also the age of patients has increased meaning that the average patient at present is likely to be a woman aged 60 years or more [1].

Age distribution
This depends on the cause. In general, the incidence and prevalance increases steeply with age. However, the heritable forms (in particular MENIN, RET and HRPT2 mutations) dominate below the age of 40-50 years. As stated above, the age of the patients has increased with time [1].

Gender distribution
In general around 75% of newly diagnosed patients are women and 25% are men. However, in the hereditary forms which are autosomally dominantly inherited a 50:50 gender distribution is seen.

Geographical distribution
The incidence varies considerably between countries. In the US an incidence of 27/100,000/year has been reported for the period 1973-1999 [2], whereas in Denmark the incidence was as low as around 4/100,000 per year for women and around 1,5/100,000/year for men between 1990 and 1999 [1]. No systematic overview of variations in incidence is available.

Single adenoma vs. hyperplasia
In general around 90% of the patients have a single adenoma, a few have adenomas of two or three glands, while around 10% have hyperplasia of all parathyroid glands [4]. Parathyroid cancer is very rare. Hyperplasia is prominent in patients with MENIN gene mutations and HRPT2 mutations, while patients with RET protooncogene mutations may have single adenomas [5].

Severity of disease
In recent years the severity of newly diagnosed cases has been declining. Fewer patients have kidney stones [6-8], serum calcium levels have been declining [1], and the weight of pathological parathyroid tissue removed has been declining [1]. As a consequence, fewer patients undergo

surgical treatment [1].

Survival

Reports on survival after a diagnosis of hyperparathyroidism have been variable and depending on severity of the disease and surgery or not. American data from patients with mild primary hyperparathyroidism have even reported better survival in patients with primary hyperparathyroidism than in the general population [9]. However, Swedish studies in more severely affected patients with primary hyperparathyroidism have shown an increased risk of death in patients with primary hyperparathyroidism [10].

Several risk factors for mortality in patients with primary hyperparathyroidism have been reported. In a Swedish study, diabetes, uric acid, and cardiovascular disease were risk factors for mortality [11]. Higher adenoma weight also seem to be a risk factor for death [12]. Kidney stones [13; 14], absence of osteoporosis [13] and absence of muscle weakness [13] seem associated with better survival.

Patients undergoing surgery seemed to have a lower risk of death than conservatively treated patients [1; 14].

The outcome of surgery is better in recent series than in prior series [1; 15]. In recent Danish series, the risk of death following surgical treatment is the same as in the background population both early after surgery and many years after surgery [1], whereas an increased mortality is present in conservatively treated patients [1].

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