

SHORT REPORT

Incidence of common compressive neuropathies in primary care

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Apart from carpal tunnel syndrome, there are no population based studies of the epidemiology of compressive neuropathies. To provide this information, new presentations of compressive neuropathies among patients registered with 253 general practices in the UK General Practice Research Database with 1.83 million patient years at risk in 2000 were analysed. The study revealed that in 2000 the annual age standardised rates per 100 000 of new presentations in primary care were: carpal tunnel syndrome, men 87.8/women 192.8; Morton's metatarsalgia, men 50.2/women 87.5; ulnar neuropathy, men 25.2/women 18.9; meralgia paraesthetica, men 10.7/women 13.2; and radial neuropathy, men 2.97/women 1.42. New presentations were most frequent at ages 55–64 years except for carpal tunnel syndrome, which was most frequent in women aged 45–54 years, and radial nerve palsy, which was most frequent in men aged 75–84 years. In 2000, operative treatment was undertaken for 31% of new presentations of carpal tunnel syndrome, 3% of Morton's metatarsalgia, and 30% of ulnar neuropathy.

There have been few population based studies of focal peripheral nerve disorders.¹ This is unfortunate because focal neuropathies are common, may present difficulties in diagnosis, and cause pain, disability, and sometimes loss of time from work. We have already used the General Practice Research Database (GPRD) to provide a population based measure of the incidence of Bell's palsy.² We have now exploited the same methods to investigate the frequency of presentation in primary care of the commonest compressive peripheral nerve disorders: carpal tunnel syndrome, Morton's metatarsalgia, ulnar neuropathy, meralgia paraesthetica, and radial nerve palsy.

METHODS

Data were obtained from the GPRD, and its Scientific and Ethical Advisory Group approved the study protocol. The GPRD is a large database including data from several hundred general practices in the UK. It includes data on all registered patients, including medical diagnostic codes for consultations and referrals and details of prescriptions issued. The data are subject to quality checks, and when the data are of a high enough quality to be used in research, they are referred to as "up-to-standard" (UTS).³

We analysed data for all 253 practices which provided UTS data continuously between 1 January 1992 and 31 December 2000. For each year of study, we calculated the number of registered patients by age, sex, and practice as the denominator. Since patients might enter or leave the registered UTS population during the year, the denominator was obtained by summing all time at risk over all patients who were registered during the year. We obtained numerator data by searching

the medical record of each registered subject for medical diagnostic codes for each of the conditions shown in table 1.

We identified Read and Oxmis codes for carpal tunnel syndrome (including carpal tunnel decompression and carpal tunnel release or injection); meralgia paraesthetica; Morton's metatarsalgia (including Morton's neuroma, Morton's foot, Morton's toe, metatarsalgia, excision of Morton's neuroma, and Morton's neuralgia); radial nerve compression (including all codes for radial nerve palsy, radial nerve lesion, closed injury of radial nerve, and operations and procedures on the radial nerve); and ulnar nerve compression (including ulnar nerve palsy, ulnar nerve lesions, neuritis of the ulnar nerve, ulnar nerve entrapment, injuries of ulnar nerve not specified as open, and operations and procedures on the ulnar nerve). New presentations were defined as the first recorded occurrence of a relevant medical code within that patient's record. Period prevalence rates were estimated by identifying cases with relevant medical codes recorded at any time from the start of the patient's record (or from 1 January 1950 if this was later) up to the end of 2000. Condition-specific treatments were less richly coded in the Oxmis coding system; we therefore only present treatment data for 2000 when Read codes were used exclusively. Numerator and denominator data were aggregated by sex and five year age group to estimate age and sex specific rates. Age standardised rates were calculated by the direct method using the European Standard Population for reference.⁴ Confidence intervals were estimated using the normal approximation method but these should be interpreted with caution when the number of cases is small.

RESULTS

Table 1 shows the numbers of new presentations for each condition and age standardised rates by study year and sex. It also gives age standardised period prevalence rates for each condition in 2000, based on any previous diagnosis of the condition in the patients' records. Carpal tunnel syndrome and Morton's metatarsalgia were considerably more frequent than the other conditions. These two conditions were also more frequent in women than men. Radial and ulnar neuropathies were more frequent in men than women. The size of the registered population increased over time, as did the annual number of cases. There was weak evidence of increasing trends in meralgia paraesthetica and metatarsalgia in women and for carpal tunnel syndrome, metatarsalgia, and ulnar neuropathy in men.

Table 2 shows age specific incidence rates for the period 1992–2000 in men and women. In general, the incidence of each condition increased up to middle age before declining again. However, the age of peak incidence varied between conditions and between men and women. Carpal tunnel syndrome was most frequent in women aged 45–54 years but in men aged 75–84 years. In men, the other compression neuropathies, except radial neuropathy, were most frequent

Table 1 Numbers of new presentations and age standardised incidence rates by sex and study year

| Study year | Patient years | Carpal tunnel syndrome | | Morton's metatarsalgia | | Ulnar neuropathy | | Meralgia paraesthetica | | Radial neuropathy | |
|-------------------------------|---------------|------------------------|-------|------------------------|-------|------------------|-------|------------------------|-------|-------------------|------|
| | | n | ASR* | n | ASR* | n | ASR* | n | ASR* | n | ASR* |
| Women | | | | | | | | | | | |
| 1992 | 881501 | 1570 | 170.0 | 682 | 76.3 | 155 | 17.3 | 93 | 10.0 | 8 | 0.72 |
| 1993 | 893406 | 1954 | 207.5 | 763 | 82.7 | 161 | 17.3 | 87 | 8.92 | 13 | 1.25 |
| 1994 | 908763 | 1842 | 192.3 | 753 | 81.7 | 143 | 15.2 | 104 | 11.1 | 15 | 1.55 |
| 1995 | 918763 | 1787 | 183.1 | 773 | 82.1 | 148 | 15.6 | 128 | 13.5 | 17 | 1.83 |
| 1996 | 915999 | 1775 | 181.5 | 819 | 87.3 | 166 | 16.8 | 108 | 11.6 | 12 | 1.31 |
| 1997 | 918483 | 1741 | 174.6 | 772 | 79.2 | 170 | 16.7 | 122 | 12.7 | 16 | 1.53 |
| 1998 | 922287 | 1835 | 183.1 | 806 | 82.2 | 162 | 16.5 | 127 | 13.6 | 14 | 1.37 |
| 1999 | 927781 | 1888 | 188.2 | 835 | 86.2 | 196 | 20.3 | 112 | 11.1 | 19 | 1.82 |
| 2000 | 928747 | 1952 | 192.8 | 866 | 87.5 | 187 | 18.9 | 130 | 13.2 | 14 | 1.42 |
| p value (trend by year) | | 0.945 | | 0.055 | | 0.125 | | 0.057 | | 0.147 | |
| Period prevalence up to 2000† | | 20895 | 2016 | 8496 | 821.9 | 1735 | 170.4 | 1111 | 108.2 | 150 | 15.0 |
| Men | | | | | | | | | | | |
| 1992 | 847536 | 572 | 64.8 | 360 | 41.3 | 169 | 19.1 | 92 | 10.5 | 19 | 2.06 |
| 1993 | 860398 | 682 | 75.4 | 343 | 38.4 | 196 | 21.9 | 105 | 12.0 | 27 | 3.01 |
| 1994 | 875779 | 737 | 80.1 | 425 | 46.6 | 211 | 23.2 | 102 | 11.2 | 23 | 2.58 |
| 1995 | 886346 | 675 | 72.5 | 431 | 46.8 | 201 | 22.0 | 98 | 10.7 | 26 | 2.77 |
| 1996 | 885012 | 713 | 75.6 | 432 | 46.1 | 208 | 22.5 | 98 | 10.4 | 28 | 3.01 |
| 1997 | 889319 | 682 | 71.5 | 465 | 49.2 | 216 | 22.7 | 115 | 12.3 | 25 | 2.51 |
| 1998 | 894318 | 775 | 79.1 | 448 | 46.7 | 221 | 23.3 | 113 | 11.8 | 22 | 2.31 |
| 1999 | 900193 | 801 | 83.1 | 421 | 43.9 | 272 | 28.6 | 116 | 12.3 | 26 | 2.76 |
| 2000 | 902973 | 877 | 87.8 | 488 | 50.2 | 240 | 25.2 | 104 | 10.7 | 29 | 2.97 |
| p value (trend by year) | | 0.019 | | 0.048 | | 0.011 | | 0.493 | | 0.456 | |
| Period prevalence up to 2000† | | 7811 | 784 | 4419 | 446.2 | 2291 | 235.0 | 1066 | 108.3 | 288 | 29.4 |

*ASR, age standardised incidence rate per 100 000 European standard population.

†Includes diagnoses before 1992.

in the 55–64 years age group. This was also true, though less consistently, in women.

In the year 2000, 619/1952 women (32%) and 270/877 men (31%) with carpal tunnel syndrome had operations (table 3). Operation for Morton's metatarsalgia was rare, being undertaken in only 30/866 affected women (3%) and 13/488 affected men (3%). Operative treatment for ulnar nerve neuropathy was undertaken in 54/187 affected women (29%) and 72/240 affected men (30%).

DISCUSSION

Our figures show a higher incidence of new presentations of carpal tunnel syndrome than that derived from a record

linkage study at the Mayo Clinic, in which the annual incidence of carpal tunnel syndrome was estimated as 99 per 100 000 with a female to male ratio of 3:1 and a higher incidence in elderly men and a peak at age 45–54 in women.⁵ There is a lack of previous population based estimates for the occurrence of new presentations of the other disorders. The present estimates derived from the GPRD confirm general reports that Morton's metatarsalgia is a common problem in practice, especially in middle aged and elderly women.⁶ Our finding that ulnar neuropathy is more common in men than in women and in elderly than in younger adults is consistent with an electrophysiological study of 112 patients diagnosed with ulnar neuropathy in which there were 66 men and 46 women and the diagnosis was more common with advancing age.⁷ In our study, meralgia paraesthetica had approximately the same frequency in the two sexes whereas the literature gives the impression that it is more common in men than women. In a hospital based series from the Punjab, 83% were men and the most frequent decade of presentation was 41–50 years.⁸ However, patterns of attendance for health care may vary in different cultures. In the present study, radial nerve palsies were recorded less often than the other conditions and there are no substantial series of patients with which our incidence figures can be compared.

Surgery for carpal tunnel syndrome in nearly a third of patients is justified by evidence of a beneficial effect demonstrated in randomised trials, although criteria for patient selection are still debated.^{9 10} No randomised trials of interventions for the other conditions have been conducted, and the value of the operations performed for them is uncertain illustrating the need for more research.

Limitations of the study

The relative rarity of some of the conditions we have studied makes it difficult to obtain estimates of incidence or prevalence from specially designed epidemiological studies in the general population. This report presents data on a large population sample based on a general practice database. General practices in the GPRD are drawn from all parts of the

Table 2 Age and sex specific rates of new presentations from 1992 to 2000. Figures are rates per 100 000 population

| Age group (years) | Carpal tunnel syndrome | Morton's metatarsalgia | Ulnar neuropathy | Meralgia paraesthetica | Radial neuropathy |
|-------------------|------------------------|------------------------|------------------|------------------------|-------------------|
| Women | | | | | |
| 0–34 | 81.5 | 29.2 | 8.72 | 6.36 | 0.58 |
| 35–44 | 289.0 | 81.9 | 28.2 | 12.7 | 1.98 |
| 45–54 | 380.1 | 161.1 | 29.2 | 18.8 | 2.32 |
| 55–64 | 294.9 | 197.4 | 27.1 | 23.7 | 2.91 |
| 65–74 | 224.9 | 145.1 | 21.8 | 21.8 | 2.00 |
| 75–84 | 260.7 | 91.4 | 20.3 | 11.3 | 2.91 |
| 85–100 | 162.9 | 42.9 | 12.9 | 3.44 | 1.72 |
| All ages* | 198.9 | 86.0 | 18.1 | 12.3 | 1.56 |
| Men | | | | | |
| 0–34 | 21.2 | 16.0 | 9.37 | 3.15 | 1.59 |
| 35–44 | 104.8 | 46.7 | 35.8 | 15.5 | 3.75 |
| 45–54 | 144.3 | 70.1 | 39.6 | 22.8 | 3.24 |
| 55–64 | 156.7 | 106.3 | 43.1 | 25.2 | 4.48 |
| 65–74 | 128.9 | 99.4 | 37.4 | 21.3 | 3.86 |
| 75–84 | 172.3 | 86.7 | 29.9 | 10.6 | 5.70 |
| 85–100 | 147.8 | 60.9 | 14.7 | 4.51 | 3.38 |
| All ages* | 82.0 | 48.0 | 24.4 | 11.9 | 2.83 |

*Crude rate.

Table 3 Comparison of age standardised incidence rates for conditions and their treatments in 2000

| Condition | Women | | Men | |
|-----------------------------|-------|------------------------|-----|---------------------|
| | n | ASR* (95% CI) | n | ASR* (95% CI) |
| Carpal tunnel syndrome | | | | |
| Incidence | 1952 | 192.8 (184.1 to 201.6) | 877 | 87.8 (81.9–93.7) |
| Operation | 619 | 59.2 (54.4 to 64.1) | 270 | 26.7 (23.5 to 29.9) |
| Morton's metatarsalgia | | | | |
| Incidence | 866 | 87.5 (81.6 to 93.4) | 488 | 50.2 (45.7 to 54.7) |
| Excision (Morton's neuroma) | 30 | 3.1 (2.0 to 4.2) | 13 | 1.3 (0.6 to 2.0) |
| Ulnar neuropathy | | | | |
| Incidence | 187 | 19 (16.1 to 21.7) | 240 | 25 (21.9 to 28.4) |
| Operative treatment | 54 | 5.6 (4.1 to 7.1) | 72 | 7.5 (5.8 to 9.2) |
| Radial neuropathy | | | | |
| Incidence | 14 | 1.4 (0.7 to 2.2) | 29 | 3.0 (1.9 to 4.1) |
| Operative treatment | 9 | 0.8 (0.3 to 1.4) | 5 | 0.5 (0.1 to 0.9) |

*Age standardised rate per 100 000 European standard population.

UK, and this increases the generalisability of the findings. However, all GPRD practices use the same computer software and choose to participate in the GPRD. This might be associated with bias towards the selection of more highly motivated, or better organised, practices. The main limitation of the study is the analysis of clinical rather than epidemiological data. Patients vary in their use of health care and it is accepted that a significant proportion of patients who are ill may not consult their doctor. Doctors also vary in their use of different diagnostic categories. Thus there may be variation in case ascertainment across this general practice sample, and which may vary according to both patient and practice characteristics. There may also be misclassification when using specific diagnostic categories. This might have varied over time as Oxmis codes were used in the earlier years of the database but were replaced by Read codes in the later years. Other studies have shown that diagnoses based on the GPRD show a high level of agreement with diagnoses confirmed through additional clinical investigation.^{11 12} It has also been demonstrated that findings of epidemiological analyses from the GPRD were consistent with those of equivalent analyses from the Fourth Morbidity Survey in General Practice, in which data were collected from a smaller number of practices.^{3 13} In spite of the potential limitations, our data provide the most precise estimates to date for the occurrence of peripheral nerve compression syndromes in any population.

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