Introduction

The term viral or aseptic meningitis refers to a meningitis for which an etiological agent is not apparent after bacterial culture of cerebrospinal fluid (CSF). Aseptic meningitis may be caused by a variety of agents including enteroviruses, lymphocytic choriomeningitis virus, mumps and measles virus. The disease may be mimicked by inadequately treated pyogenic meningitis, tuberculous, cryptococcal and cerebrovascular syphilis. The syndrome is characterised by acute onset, fever, headache and stiff neck brought on by inflammation of the tissues that cover the brain and spinal cord. Diagnostic work-up of aseptic meningitis is often incomplete, and an etiological agent is identified in less than half of all cases. Aseptic Meningitis maybe a serious condition and can be very debilitating but is only rarely fatal.

Methods

HIPE (Hospital In-Patient Enquiry System) is the principal source of data on discharges from acute hospitals in the Republic of Ireland and is the responsibility of The HIPE and NPRS Unit at the Economic and Social Research Institute (who kindly provided the dataset for this study). All hospital in-patient admissions from 1997 to 2001 with a principal diagnosis relating to infectious and parasitic diseases (ICD codes 001 - 139) involving residents from the NEHB (Cavan, Monaghan, Louth) were extracted. For each of these listed notifiable diseases. Although national notifications of viral meningitis in Ireland have increased between 1997 and 2001 (32 and 161 respectively), anecdotal evidence suggests the true number of infections is seriously underestimated/under-reported. The aim of this study therefore was to quantify the burden of viral meningitis on hospitals from 1997 to 2001 in the NEHB and compare the results to statutory notifications for the same period.

Results

A total of 265 NEHB residents were admitted to hospital with viral meningitis in 1997 compared to 111 hospitalisations in 2001 (Table 1). This number is much lower than expected given the corresponding number of hospital admissions during the same period. Hospitalisations due to viral meningitis as a percentage of total hospitalisations for VM* 21 20 19 100 111 271

Table 1. Summary Data for Viral Meningitis Cases (1997 to 2001)

<table>
<thead>
<tr>
<th>Year</th>
<th>1997</th>
<th>1998</th>
<th>1999</th>
<th>2000</th>
<th>2001</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total hospitalisations for VM*</td>
<td>21</td>
<td>20</td>
<td>19</td>
<td>100</td>
<td>111</td>
<td>271</td>
</tr>
<tr>
<td>Total number of patient discharges</td>
<td>21</td>
<td>19</td>
<td>18</td>
<td>99</td>
<td>108</td>
<td>265</td>
</tr>
<tr>
<td>Total number of VM* notifications for NEHB residents</td>
<td>4</td>
<td>3</td>
<td>8</td>
<td>12</td>
<td>11</td>
<td>38</td>
</tr>
<tr>
<td>Total bed days for VM* hospitalisations</td>
<td>115</td>
<td>145</td>
<td>100</td>
<td>413</td>
<td>461</td>
<td>1234</td>
</tr>
<tr>
<td>Age standardised incidence rate/100,000 population</td>
<td>6.11</td>
<td>5.85</td>
<td>5.4</td>
<td>29.6</td>
<td>32.2</td>
<td></td>
</tr>
<tr>
<td>Total hospital admissions for NEHB residents</td>
<td>45310</td>
<td>44875</td>
<td>49682</td>
<td>53075</td>
<td>43394</td>
<td>265761</td>
</tr>
<tr>
<td>VM* / total infectious disease hospitalisations/ year</td>
<td>1.15</td>
<td>1.16</td>
<td>1.16</td>
<td>6.65</td>
<td>6.15</td>
<td></td>
</tr>
</tbody>
</table>

* VM Viral Meningitis

Viral meningitis admissions by NEHB residents rose dramatically between 1997 and 2001 with 21 hospitalisations in 1997 compared to 111 hospitalisations in 2001 (Table 1). This represents an increase of 429% in viral meningitis hospitalisations during this period. This increase was reflected in all of the NEHB hospitals and various other hospitals that NEHB residents attended outside the region. Hospitalisations due to viral meningitis as a percentage of total hospitalisations increased from 0.2% in 1997 to 0.4% in 2001 (Table 1). This represents a significant increase of 100% in viral meningitis hospitalisations during this period. This increase was reflected in all of the NEHB hospitals and various other hospitals that NEHB residents attended outside the region. Hospitalisations due to viral meningitis as a percentage

Abstract

This study aimed to compare trends in both hospital admissions and notifications of viral meningitis in the North Eastern Health Board (NEHB) from 1997 to 2001, involving NEHB residents with an infectious disease diagnosis, and examine whether viral meningitis cases were adequately identified. Hospital admissions involving NEHB residents with a principal diagnosis of viral meningitis – an increase of 429% between 1997 and 2001 with the bulk of this increase during 2000 and 2001. A total of 1,234 bed days were taken up by this cohort of patients which was 4.5 times the mean length of stay was 4.5 days (95% CI 4.2 - 4.9). The number of viral meningitis notifications in the NEHB was 38 (ranging from 4 in 1997 to 11 in 2001). This number is much lower than expected given the corresponding number of hospital admissions for the same period. Thus, most cases were not notified which means that current surveillance systems underestimate the disease burden of viral meningitis. Such under-reporting has implications for infectious disease policy in Ireland.
The majority of viral meningitis patients (78.9%) had a procedure carried out while in hospital. The most common procedure, lumbar puncture (389 patients, 71.3%), was followed by a CAT brain scan (41 patients, 4.5%). Although, 2.6% of patients had an injection of antibiotics listed as one of their procedures, the HIPE dataset provided no detailed information on the specific antibiotics or dosage prescribed. The average number of bed days taken up by viral meningitis patients was 4.1 days (ranging from 1 to 105 days). A total of 115 bed days were taken up by viral meningitis patients in 1997 but this rose dramatically to 413 in 2000 and 2001. The time to offer education and feedback to relevant healthcare workers on the importance of the notification process to laboratories as notifiers and a national computerised infectious disease reporting system in preparation, now is also like this one may provide a baseline for comparing the effectiveness of the new reporting system. Perhaps with a new notifiable disease list (introduced on the 1st of January 2004), the inclusion of microbiology laboratories as notifiers in the dataset could reduce the time to offer education and feedback to relevant healthcare workers on the importance of the notification process. The increase in the disease burden of viral meningitis: there was a substantial increase in the total number of bed days per year taken up by viral meningitis patients during 1997 to 2001 even though the average number of bed days per patient remained constant. Furthermore, there were 115 bed days taken up by viral meningitis patients in 1997 (18 of which were taken up in the first 5 days), whereas there were 115 bed days taken up in the first 5 days in 1998 (28 of which were taken up in the first 5 days). The total number of bed days taken up by viral meningitis patients in 1997 to 2001 could not be significantly decreased within the study period. However, it is interesting to note that the notification pattern in 2000 and 2001 broadly follows the pattern of viral meningitis hospitalisations during the same period albeit at a much reduced level (Figure 2).

Discussion

This study demonstrates that the number of NEHB residents hospitalised for viral meningitis increased significantly between 1997 and 2001, and that the majority of these cases were not notified. This study also highlights the increase in the disease burden of viral meningitis: there was a substantial increase in the total number of bed days per year taken up by viral meningitis patients during 1997 to 2001 even though the average number of bed days per patient remained constant. Furthermore, there were 115 bed days taken up by viral meningitis patients in 1997 (18 of which were taken up in the first 5 days), whereas there were 115 bed days taken up in the first 5 days in 1998 (28 of which were taken up in the first 5 days). The total number of bed days taken up by viral meningitis patients in 1997 to 2001 could not be significantly decreased within the study period. However, it is interesting to note that the notification pattern in 2000 and 2001 broadly follows the pattern of viral meningitis hospitalisations during the same period albeit at a much reduced level (Figure 2).

CSF microscopy and cultures are normally required to differentiate between bacterial and viral meningitis so it is not surprising to note that lumbar puncture was the primary procedure performed in 71.3% of patients diagnosed with viral meningitis. The average length of hospital stay for this cohort was 4.5 days perhaps because of the severity of symptoms but more likely due to the need to exclude more serious causes of meningitis. The underreporting of viral meningitis hospitalised cases in NEHB residents is alarming. If this level of under-reporting is similar in other health boards, then the national figures for viral meningitis are also grossly underestimated. The disease burden of viral meningitis and perhaps other diseases goes essentially unnoticed and this has large cost implications to the healthcare system, policy and society. The failure of the national system to provide exact figures casts doubt on the effectiveness of the notification process as a real-time surveillance tool and an early warning system for outbreaks. Various studies have suggested that a lack of knowledge of the list of notifiable infectious diseases and a lack of understanding of the importance of notification contributes to poor clinician reporting. Perhaps with a new notifiable disease list (introduced on the 1st of January 2004), the inclusion of microbiology laboratories as notifiers and a national computerised infectious disease reporting system in preparation, now is also the time to offer education and feedback to relevant healthcare workers on the importance of the notification process for accurate health action and for the monitoring of disease incidence in the Irish population. Finally, studies like this one may provide a baseline for comparing the effectiveness of the new reporting system.

Addendum

Since this paper was submitted for publication, the 2002 HIPE data became available. In 2002 there were 34 NEHB residents hospitalised with a principal diagnosis relating to viral meningitis. However there were only 4 cases of viral meningitis notified for NEHB residents which gives a meagre notification rate of 12%.

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References