The Changing Epidemiology of the Bronchiolitis Epidemic in Tallaght Hospital

Abstract:

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Abstract

Bronchiolitis affects one third of babies in their first year of life. We investigated all bronchiolitis admissions to Tallaght Hospital in the last five years, with the hope of providing an insight into the epidemic in an Irish population. We analysed these 1,202 admissions on the basis of time of year (busiest being December at 24.2%), length of stay (mean 2.92 days), gender (62% male) and age (mean 30.29 weeks). There was a 102% increase in the average number of admissions for the first 6 months of 2011 and 2012 (186) compared to the previous four years (92.25). P value was statistically significant at 0.0469. Our findings were backed up by comparable data from OLCH, Crumlin (149.5 for 2011-2012 vs 36.25 for 2007-2010). There has been a significant shift in the timing and incidence of bronchiolitis in Tallaght Hospital in the last two years. We explored the possible reasons for this, with special attention to RSV incidence, climate causes and vaccine programs.

Introduction

Bronchiolitis affects one third of babies in their first year of life. 10% of these babies will be hospitalised. About half of all babies admitted to hospital with bronchiolitis develop a persistent cough and wheeze. Bronchiolitis is therefore a major burden on our health care services. This study aims to address the issue of mapping out the characteristics of this epidemic in order to aid accurate planning and treatment provision into the future.

Methods

We included in our study all cases where bronchiolitis was the primary admission criteria to Tallaght hospital in the last five years, irrespective of respiratory syncytial virus (RSV) status, as per the discharge summary and HIPE databases. These cases were then analysed and broken down into annual and subsequently monthly figures for the last five years. We also considered the age and sex of the patient, as well as the length of stay. We used relevant statistical tests to evaluate and validate our results. To test the validity of our results, we compared figures from these parameters to those from Our Lady’s Children’s Hospital (OLCH), Crumlin, supplied by the RSV bronchiolitis service in OLCH.

Results

Tallaght hospital had 1202 admissions due to bronchiolitis from 2007-2011 inclusive, with a further 206 cases up to the start of July 2012. There were 263 in 2007, 222 in 2008, 257 in 2009, 188 in 2010 and 272 in 2011. The mean age of children was 30.29 weeks, the median was 24 weeks. The most common week for admission was the 9th week of life. The majority of inpatients 62% were male. The average length of stay in hospital was 2.92 days over the 5 years. Median length of stay was 2 days. The average length of stay has been decreasing since 2008 when it stood at 3.35 days to 2.54 days in 2012. This compares favourably, or on a par, with most international figures.9,10,11 32% of children stayed only one day, 24% 2 days and 17% 3 days. 5% of children stayed one week or more. The busiest month was December, with 24.2% of cases for the whole 5 years. This was followed by November with 16.1%, January with 15.1%, February with 9.5%, March with 8.4%, October with 6.3%, April with 6.1% and September with 4.7%. The other four months contributed less than 3.5% each to the total figures.

Interestingly, however, there appears to have been a large increase in the occurrence of bronchiolitis in the early part of both 2011 and 2012. Compared to the previous three years, the spike in figures at the end of 2010 was less than what should have been expected (see Figure 1). This resulted in a substantially lower than average total for 2010. There was then a subsequent large rise in the early part of 2011. Again, the spike at the end of the year was less than what would have been expected for the years prior to 2010. However, the large increase in numbers at the start of the year was more than enough to compensate for this, and resulted in 2011 being the busiest year in our dataset. This rise in numbers in the early part of the year has continued into 2012, with the first 6 months of 2012 being the busiest of any year in our dataset. In fact, the first 4 months of 2012 had more admissions with bronchiolitis than all of 2010 (189 vs 188).

The average number of admissions for the first 6 months of the year for 2007-2010 was 92.25. The average number for 2011-2012 was 186 (Table 1). These averages were then analysed using the Wilcoxon signed rank test, which produced a p value of 0.0469. This implied than there was a statistically significant increase in the bronchiolitis figures for the first 6 months of 2011 and 2012 compared to the previous 4 years. To rule out possible confounding factors in Tallaght Hospital, we analysed the number of patients admitted to Our Lady’s Children’s Hospital (OLCH), Crumlin with RSV positive bronchiolitis in the same time period. The pattern seen above was repeated in OLCH, with a large spike in the early part of the year for the last two years. The average number of admissions in OLCHC with RSV positive bronchiolitis for the first 6 months of the year for 2007-2010 was 36.25. The average for the first 6 months for 2011-2012 was 149.5.

Discussion

There was a statistically significant increase in the number of bronchiolitis cases in Tallaght Hospital in the early part of 2011 and 2012 compared to the previous four years. There was a similar increase in RSV positive bronchiolitis in Our Lady’s Children’s Hospital, Crumlin in the same time period. These figures correspond to those of the Irish Health Protection Surveillance Centre, which show an increase in RSV positive test results in the early part of 2011. These figures have continued in a similar vein into 2012. The cause for this increase is not fully apparent. It is possible that the increased number of RSV epidemics can be both climate and climate independent factors. Epidemiologic evidence of climate influences on RSV epidemics is substantial. In Europe, annual RSV epidemics have traditionally begun in the coldest parts of the continent - Northern Russia/Finland first, in October. The epidemic risk then rises in numbers in the early part of the year has continued into 2012, with the first 6 months of 2012 being the busiest of any year in our dataset. In fact, the first 4 months of 2012 had more admissions with bronchiolitis than all of 2010 (189 vs 188).

In Ireland, 2010 was an exceptionally cold year, with December temperatures nearly 5% lower than normal.5,6 This difference may have been a significant contributor to the change in the epidemic pattern. With regard climate independent factors, the vaccine roll out in Ireland may never have been known why there was a shift in the timing of the annual bronchiolitis epidemic into 2010, and why this continued into 2012. Future investigation is warranted to evaluate if this trend continues, and what factors may be contributing to it. As a large contributor to ill health in Ireland’s paediatric population, close monitoring of it is vital to future planning of our health service.
Acknowledgements
Bronchiolitis Service, OLCH

References
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