Recurrence of acute otitis media at preschool age in Sweden

Finn Rasmussen

Abstract

Study objective – The probability of recurrence of acute otitis media during the preschool years was investigated.

Setting – All children born in a semirural Swedish municipality were followed up from birth to their 7th birthday.

Design – Information about visits to physicians for acute otitis media was collected retrospectively at all primary health care centres and at paediatric and ear, nose, and throat departments. Check up visits after acute otitis media were excluded. Life table methods were used for analyses.

Participants – All 1306 children born in the study municipality between 1977 and 1981 were included. Children who moved from the study area during the follow up years (24%) were included in the analyses from the date of birth to the date they left the area.

Main results – At age 3 years, 38%, 10%, and 4% of the children had made at least one, three, and five visits respectively to a physician because of acute otitis media. By their 7th birthday, 61%, 24%, 12%, and 2% of the children had made at least one, three, five, and 10 visits respectively to a physician because of this disorder.

Conclusions – A strong association was found between the number of visits made for acute otitis media during the first year of life and the probability of visiting a physician because of this disorder over the next 12 months.

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In spite of the research on risk factors for acute otitis media that has been undertaken over the past decades,¹⁻¹¹ there is no precise, population based information on the risk of recurrence of this disorder in relation to age and the number of previous episodes. Information about the probabilities of recurrence in unselected groups of children would be useful when policy decisions are made about the appropriate health care level for check up examinations after acute otitis media. The present study was undertaken: (a) to assess the probability of a specified number of visits to a physician for acute otitis media at defined preschool ages, and (b) to assess the probability of a new visit to a physician for acute otitis media conditional on the number of previous visits for this disease.

Methods

STUDY AREA

The municipality of Östhammar, with a population in 1980 of 21 028, is located in the County of Uppsala, 70 km (43 miles) north east of the city of Uppsala and 140 km (87 miles) north of Stockholm. Two thirds of the population live in five small urban centres and the remainder in rural areas.

In Östhammar primary health care is available at one large and three smaller primary health care centres. There was no otorhinolaryngologist (ENT specialist) working in the study area between 1977 and 1988, and most specialised outpatient care and all inpatient care for children was provided at the hospitals in Uppsala.

SUBJECTS

The study population comprised all 1306 children born in the municipality of Östhammar between 1977 and 1981.¹² Information about the children's date of birth, gender, and address was collected from the county civic population register. Additional demographic data about dates of emigration or death, if relevant, were collected from parish offices in Östhammar. By the children's 1st, 3rd, and 7th birthdays 6%, 15%, and 24%, respectively, had moved from the municipality of Östhammar.

VISITS TO A PHYSICIAN FOR ACUTE OTITIS MEDIA

In this study, acute otitis media is defined as acute inflammation of the middle ear with redness of at least one eardrum in addition to earache or fever of at least 38°C, or both. Earache or redness of an eardrum without fulfilment of the above criteria was categorised as "suspected acute otitis media" and coded separately.

Information about all visits made to a physician for acute otitis media by the 1306 children between 1 January 1977 and 31 December 1988 was collected from patient records held at the primary health care centres in the study area and at the departments of paediatrics, otorhinolaryngology (ENT), audiology and phoniatrics at the hospitals in Uppsala. All visits to a physician for definite or suspected acute otitis media were recorded retroactively on a special form with information about the dates of the visits and the department. Visits made for check up after an acute episode were not included. All patient records were scrutinised by the author. The principal outcome variable is the date of a visit to a physician for acute otitis media.

Department of
Paediatrics,
University Hospital,
S-751 85 Uppsala,
Sweden
F Rasmussen

Correspondence to:
Dr F Rasmussen.

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An episode of acute otitis media is not the same as a visit to a physician for the disorder. Children may make *no* visit or *more than one* visit to a physician during the same episode of acute otitis media. One important reason for making a second visit during an episode may be therapeutic failure (unchanged or flaring symptoms after three days of antibiotic treatment). In some of the analyses described below, visits to a physician for acute otitis media made within a week of a first visit for the disorder were excluded to find out whether this would affect the results.

STATISTICS

The starting point of all observation periods was the date of birth, and the end point the date of a visit to a physician for acute otitis media. The follow up period was seven years.

Table 1 Cumulative proportions of 1306 children who had made at least the specified number of visits to a physician for acute otitis media during the first 7 years of life

No of visits	Follow up period in years of life							Proportion censored by the 7th birthday
	1-0	2-0	3-0	4-0	5-0	6-0	7-0	
1	0.14	0.29	0.38	0.46	0.53	0.56	0.61	0.17
2	0.04	0.13	0.19	0.26	0.31	0.36	0.40	0.20
3	0.02	0.06	0.10	0.14	0.18	0.21	0.24	0.22
4	0.01	0.03	0.06	0.09	0.12	0.14	0.18	0.22
5	0.00	0.02	0.04	0.06	0.08	0.10	0.12	0.23
6	0.00	0.01	0.03	0.04	0.06	0.07	0.09	0.23
7	0.00	0.01	0.02	0.03	0.04	0.04	0.06	0.23
8	0.00	0.01	0.01	0.02	0.03	0.03	0.05	0.23
9	0.00	0.00	0.01	0.01	0.02	0.02	0.03	0.23
10	0.00	0.00	0.01	0.01	0.02	0.02	0.02	0.23

Table 2 Cumulative proportions of 1306 children who had made at least the specified number of visits to a physician for acute otitis media or suspected acute otitis media during the first 7 years of life

No of visits	Follow up period in years of life							Proportion censored by the 7th birthday
	1-0	2-0	3-0	4-0	5-0	6-0	7-0	
1	0.20	0.38	0.47	0.55	0.62	0.64	0.69	0.15
2	0.07	0.21	0.28	0.35	0.40	0.44	0.49	0.18
3	0.03	0.12	0.17	0.23	0.28	0.32	0.36	0.20

Table 3 Probability of visiting a physician for acute otitis media during one year in relation to the number of such visits during the preceding year or years

No of visits for acute otitis media in first year or years of life	No of children at risk at the beginning of the next 12 mth	Probability of visiting a physician for acute otitis media again during the next 12 mth (95% CI)
First year:		
0	1059	0.18 (0.15, 0.20)
1	119	0.38 (0.29, 0.47)
2	28	0.57 (0.39, 0.76)
≥ 3	50	0.87 (0.78, 0.97)
First two years:		
0	834	0.13 (0.11, 0.15)
1	187	0.28 (0.21, 0.34)
2	81	0.30 (0.20, 0.41)
≥ 3	119	0.76 (0.68, 0.84)
First three years:		
0	687	0.13 (0.11, 0.16)
1	207	0.27 (0.21, 0.33)
2	109	0.34 (0.25, 0.43)
3	41	0.42 (0.26, 0.57)
≥ 5	48	0.53 (0.39, 0.67)
First four years:		
0	583	0.13 (0.10, 0.16)
1	213	0.18 (0.13, 0.23)
2	130	0.28 (0.20, 0.36)
3	57	0.42 (0.29, 0.55)
≥ 5	61	0.53 (0.40, 0.65)
First six years:		
0	445	0.08 (0.05, 0.11)
1	208	0.12 (0.08, 0.17)
2	151	0.13 (0.08, 0.19)
3	70	0.20 (0.11, 0.29)
≥ 5	104	0.40 (0.30, 0.49)

Children who moved from the municipality or died before their 7th birthday were included in the analyses from the date of birth to the date of migration or death. Children who moved or died before the studied event occurred are type-1 censored cases. Cumulative proportions of children with a specified number of visits to a physician for acute otitis media were estimated by the Kaplan-Meier and the actuarial life table methods.^{13 14}

Results

Table 1 shows the cumulative proportions of children who had made at least the specified number of visits to a physician for acute otitis media during the first 7 years of life according to the strict diagnostic criteria. By the 2nd birthday, 29% had made at least one visit for acute otitis media, 13% at least two, and 2% at least five. By the 7th birthday, 61% had made at least one, 40% at least two, 12% at least five, and 2% at least 10 such visits for acute otitis media.

When those visits for acute otitis media that took place within seven days of a first visit to a doctor for the disorder were excluded from the analyses, 12% of the children were shown to have visited a physician because of acute otitis media at least twice by their 2nd birthday, 30% by their 5th birthday, and 39% by their 7th birthday. The slight decrease in the cumulative proportions of children who had made two or more visits, compared with the results in table 1, could be explained mainly by elimination of visits to a physician for therapeutic failure. It is unlikely that the results would be affected more than marginally by a visit made during the second week after a first visit for acute otitis media.

The cumulative proportions of children who had made at least one, two, or three visits to a physician for definite or suspected acute otitis media are seen in table 2. Comparisons between tables 1 and 2 show that the cumulative percentages, including suspected acute otitis media, are about 10% higher than those for acute otitis media alone.

Table 3 shows the probability of making a visit to a physician for acute otitis media during one year of life in relation to the number of such visits during the preceding year or years. Among the 1059 children who had not seen a physician for acute otitis media during the first year of life, 18% made such a visit during the following year. Of the 119 children who had made one visit for acute otitis media during the first year of life, 38% made at least one more such visit during the second year of life.

As seen in table 3 the probability of being stricken by acute otitis media within one year in relation to the previous number of visits to a doctor because of this disorder was much lower between age 3-5 than during the first two years of life. Of the children who visited a physician for acute otitis media once during the first two years of life, 28% made at least one more visit for the same disease during the following 12 months. In contrast, only 12% of the children who made one visit to a physician

for acute otitis media during the first six years of life made one more visit for this disorder during the following year.

The analyses underlying table 3 included only the children who had lived in the study area from birth and for at least the number of years specified in the first column. The 104 children who had made five or more visits during their first six years of life had thus lived in Östhammar for at least six years. According to the principles of life table analysis, some of these children may have migrated from the study area during the 7th year of life: in fact, two children did so.

Discussion

This epidemiological study of acute otitis media that covers a total population of children living within a geographically defined area has a limitation in that the diagnoses were usually made by family doctors and paediatricians using pneumatic otoscopy and not by ENT specialists using an otomicroscope. However, all patient charts were scrutinised by the author who applied clearly defined diagnostic criteria. A medical record including the information required for making a decision about the diagnosis was found for nearly all the children at the primary health care centres or at the hospital departments, or both. When acute otitis media was suspected but the information in the medical record did not fulfil the criteria, the condition was coded as "suspected acute otitis media".

This study focused on the occurrence of visits to a physician for acute otitis media, and not on actual episodes of the disorder. However, when all visits to a physician for acute otitis media made within a week of a first such visit were excluded, the cumulative proportions of children who made two or more visits decreased only marginally. This indicates that the results may give a reasonably good estimate of the occurrence of episodes of acute otitis media.

In another unselected cohort of Swedish preschool children, the proportion who had made at least one visit to a physician for acute otitis media was 19% by the 1st birthday and 65% by the 5th birthday.¹¹ In the present study, the cumulative incidence was 14% by the 1st birthday and 53% by the 5th birthday. However, when visits for suspected acute otitis media were added, the corresponding figures increased to 20% and 62% respectively, which agrees with the results of a study in Malmö, Sweden.⁸

The strict application of the diagnostic criteria in the present study from Östhammar is presumably the main reason why the estimates are somewhat lower than those in the Malmö

study.⁸⁻¹⁰ However, this divergence might also be partly explained by a lower incidence of acute otitis media in semirural areas, such as Östhammar, compared with large cities.

In Sweden and Finland, official consensus conferences^{15,16} on the medical care of acute otitis media and secretory otitis media have been conducted. The conference reports, however, include no or only vague recommendations about the medical follow up of children with recurrent acute otitis media. This study shows that children under 1 year of age with two or more episodes of acute otitis media and children between 1 and 2 years of age with three or more episodes of the disorder run a much higher risk of recurrence than older preschool children with an equivalent number of episodes. These findings should be taken into account when policy decisions are made regarding the appropriate level of medical care for check up examinations after acute otitis media.

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