Anesthesiology
V 45 No 1 July 1976

Incidence of Respiratory Allergy Not Increased after Anesthesia in Infancy

Anne Jones, M.B., F.F.A.R.C.S., D. J. Steward, M.D., F.R.C.P.(C),†*
G. J. Donsky, M.D., F.R.C.P.(C),‡ R. P. Orange, M.D.,§
T. Milko, B.Sc.¶

A 12-year follow-up study of children who had had operations with general anesthesia in infancy and of nonhospitalized children of the same age showed almost identical incidences of respiratory allergy in the test and control groups. General anesthesia in infancy does not predispose to respiratory allergies in childhood. (Key words: Allergy, pediatric; Anesthesia, respiratory allergies.)

IT HAS BEEN SUGGESTED that general anesthesia in infancy may predispose to respiratory allergy during childhood,[1] and that elective procedures should be deferred if possible until after 2 years of age.

A controlled study was performed to elucidate the relationship between anesthesia, operation, and allergies in children.

Methods and Results

Three groups of children were studied:

Group 1 included patients who had had pyloromyotomy at The Hospital for Sick Children, Toronto, during 1961–62. They were less than 3 months old at operation; general anesthesia was used.

Group 2 was made up of patients who had had operations for hernia or strabismus at The Hospital for Sick Children in 1963. They were less than 2 years of age at operation; general anesthesia was used.

Group 3 included children born at the Toronto General Hospital during 1961–62. The sample group comprised the first ten births in each month, after exclusion of children found to have had surgical operations in infancy.

The children were traced through hospital records, family doctors' records, and telephone directories. As the population of metropolitan Toronto is fairly mobile, only approximately 50 per cent of the children in each group could be traced from the 12–14-year-old data. Parents replied to a questionnaire designed to determine whether an allergy had been diagnosed in the children, or whether the symptoms of atopy existed, and if so, the age at onset of relevant symptoms, surgical operations, and allergic conditions in family members.

Questionnaires completed totalled 280, representing 44 per cent of the overall sample; response rates were similar in the three groups. The incidence of respiratory allergy that had developed by age 14 years was not significantly different ($P > 0.5$) in any group (table 1).

Discussion

The findings in this retrospective study did not support the hypothesis that surgical procedures during infancy are followed by an increased incidence of respiratory allergy.

Since Collicott *et al.*,[2] in 1972, showed an apparently high incidence of allergies in children operated upon in infancy, this relationship has been investigated by several other groups. Johnstone *et al.*,[1] who compared the prevalence of asthma and hay fever in a population of children who had had surgical treatment for pyloric stenosis or hernia in infancy with that in the general population, suggested a relationship between anesthesia and later allergy. They found a very high in-

* Fellow in Anesthesia.
† Anesthetist-in-Chief.
‡ Staff Physician.
§ Immunologist-in-Chief.
¶ Medical student.

Received from the Departments of Anaesthesia, Allergy and Immunology, The Hospital for Sick Children, Toronto, Canada. Accepted for publication February 24, 1976. Presented at the Annual Meeting of the American Society of Anesthesiologists, Chicago, Illinois, October 1975.

Address reprint requests to Dr. D. J. Steward, Room 2304, The Hospital for Sick Children, 555 University Avenue, Toronto, Ontario, Canada M5G 1X8.

TABLE 1. Incidences of Respiratory Allergy at Age 13–14 Years in Three Groups*

	Number of Patients	Allergy	
		Number	Per Cent
Group I	84	14	16.7
Group II	106	23	21.7
Group III	90	19	21.1

* Children who underwent pyloromyotomy in infancy (Group I), children who underwent herniotomy or strabismus correction before 2 years of age (Group II), and children without surgery or other hospitalization (controls: Group III).

TABLE 2. Reported Incidences of Respiratory Allergy* in General Epidemiologic Studies of Children

	Number of Patients	Respiratory Allergy (Per Cent)
Crook *et al.*[4] (1968)	940	18.0† 32.0‡
Freeman and Johnson[5] (1964)	2,235	28.5
Tecumseh County[6] (1974)	9,800	16.3
Present study	280	19.8

* Hay fever, asthma, and perennial allergic rhinitis.
† Definite allergy.
‡ Includes probable allergy.

cidence (35–45 per cent) in the surgical groups. There were no controls in this study, and this may have led to bias toward the unwarranted diagnosis of allergy. These authors also compared a group of children who had histories of asthma, hay fever, or perennial rhinitis with a matched control group not having these conditions, seeking a history of hospitalization, operation, and general anesthesia in each group. The incidence of operations with general anesthesia in infancy appeared significantly greater in symptomatic children than in the matched controls; however, the numbers involved were small.

Ballentine *et al.*[3] compared the incidence of allergy in 284 children who had pyloromyotomy between 1960 and 1974 with the reported incidence of allergy in the United States, but found no difference between these groups.

In our study we tried to avoid statistical bias that might have influenced the results of previous surveys. Thus, we determined the incidences of respiratory allergy in three groups of children who had grown up in the same city during the same years. The same questionnaire was completed by telephone for every child in each group. Only 44 per cent of the original patients sought could be traced; however, the percentages of completed questionnaires were similar in all groups.

The overall incidence of respiratory allergy in the children in our study is essentially similar to incidences in other national epidemiologic surveys (table 2).[4–6] The results of our survey do not support the contention that the avoidance of elective surgical procedures during the first two years of life will significantly lessen the likelihood of respiratory allergy in later life.

References

1. Johnstone DE, Roghmann KJ, Pless IB: Factors associated with the development of asthma and hay fever in children: The possible risks of hospitalization, surgery and anesthesia. Pediatrics 56:398–403, 1975
2. Collicott PE, Chappell JS, Bill AH: Is there a correlation between allergy and infantile pyloric stenosis? Pediatrics 49:768–769, 1972
3. Ballentine TVN, Tapper D, Mueller H, et al: Pyloromyotomy: Does surgery in infancy increase allergy? Pediatrics 56:404–406, 1975
4. Crook WG, Hanson W, Clawford SE: Incidence of allergy in general practice of pediatrics. J Pediatr 52:20–29, 1968
5. Freeman GL, Johnson S: Allergic disease in adolescents. Am J Dis Child 107:549–559, 1964
6. Broder I, Higgins MW, Mathews KP, et al: Epidemiology of asthma and allergic rhinitis in a total community, Tecumseh, Michigan. J Allergy Clin Immunol 53:127–138, 1974