

Tonsillectomies: in dollars and cents

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Summary: Over the last quarter of a century, much controversy has been generated on the indications for tonsillectomy and adenoidectomy. The economic aspects of this operation have received comparatively little attention. The rate per 10,000 children 0 to 19 years of age for the whole province of Ontario for the year 1971 was 174 and ranged from a high of 307 in one county to a low of 59 in another. The total cost of these operations to the health insurance plan was 11.4 million dollars. National studies on the indications for these operations, their benefits and hazards are urgently required.

Résumé: L'amygdalectomie: ses répercussions financières

Depuis un quart de siècle, sévit une âpre polémique sur les indications de l'amygdalectomie et de l'adénoïdectomie. Pourtant, les retentissements pécuniaires de cette opération ont été relativement négligés. La fréquence de cette opération durant l'année 1971, dans toute la province d'Ontario, a été de 174 sur 10,000 patients d'âge variant de 0 à 19 ans. Les deux extrêmes géographiques ont été de 307 cas dans un comté et de 59 dans un autre. Ces opérations ont coûté au régime de l'assurance maladie un total de 11.6 millions de dollars. Il nous paraît urgent d'entreprendre à l'échelle nationale une étude sur les indications de ces opérations, leurs avantages et leurs risques.

Both popular and medical literature abound with debates over the necessity for tonsillectomy with or without adenoidectomy to which we shall apply the term TONSAD. The frequency of these debates is almost matched by the frequency of critiques on professional experience and experimental methodology to date. Several very serious questions remain concerning the morbidity,¹⁻⁴ the recommended age for operation^{4,5} and the indications for and results of operation.³⁻⁹ While answers to these questions are vague or conflicting, physicians continue to invoke subjective considerations to determine their policy.

The economic aspect of the TONSAD question has received little attention in the literature. The wide varia-

tions of clinical practice in this area indicate that the whole subject requires serious and accurate investigation. In this article we propose to examine the economic significance of TONSAD surgery.

Source of information

Information on TONSAD operations, for individual counties in Ontario, supplying patient age and the number of days spent in hospital for this purpose in 1971, was provided by the Ontario Ministry of Health.¹⁰ The county populations were taken from the 1971 Census of Canada, Advance Bulletin.¹¹ From this it was possible to calculate the operation rate per 10,000 individuals for the age groups 0 to

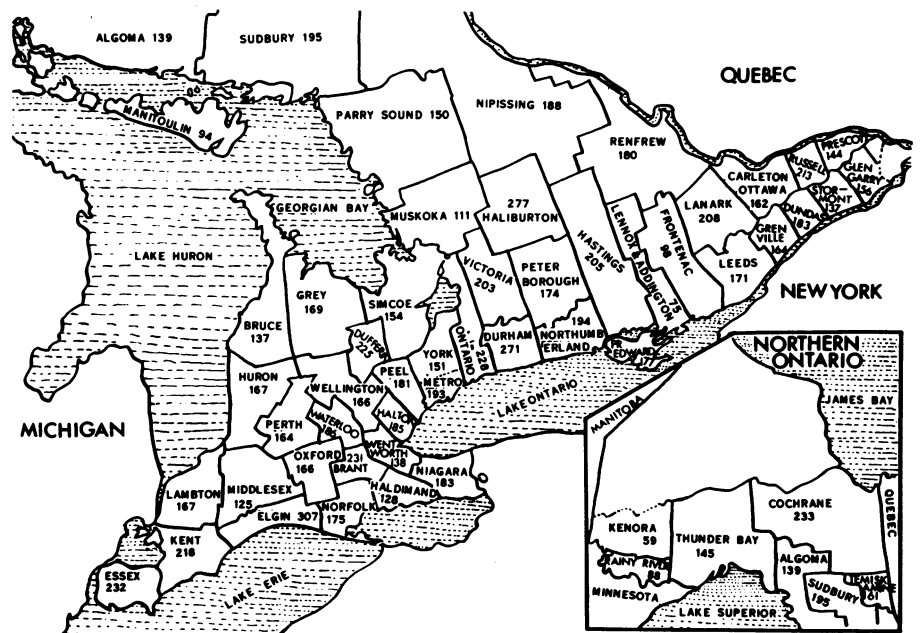


FIG. 1—Tonsillectomy with/without adenoidectomy rate per 10,000 children 0 to 19 years by county. Ontario, 1971.

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Aldomet[®]*

Tablets
(methyldopa, MSD Std.)

Indications: Sustained moderate through severe hypertension.

Dosage Summary: Start usually with 250 mg three times daily during the first 48 hours; thereafter adjust at intervals of not less than two days according to the patient's response. Maximal daily dosage is 3.0 g of methyldopa. In the presence of impaired renal function smaller doses may be needed.

Syncope in older patients has been related to an increased sensitivity in those patients with advanced arteriosclerotic vascular disease and may be avoided by reducing the dose.

Tolerance may occur occasionally between the second and third month after initiating therapy. Effectiveness can frequently be restored by increasing the dose or adding a thiazide.

Contraindications: Active hepatic disease such as acute hepatitis and active cirrhosis; known sensitivity to methyldopa; unsuitable in mild or labile hypertension responsive to mild sedation or thiazides alone; pheochromocytoma; pregnancy. Use cautiously if there is a history of liver disease or dysfunction.

Precautions: Acquired hemolytic anemia has occurred rarely. Hemoglobin and/or hematocrit determinations should be performed when anemia is suspected. If anemia is present, determine if hemolysis is present. Discontinue methyldopa on evidence of hemolytic anemia. Prompt remission usually results on discontinuation alone or the initiation of adrenocortical steroids. Rarely, however, fatalities have occurred.

A positive direct Coombs test has been reported in some patients on continued therapy with methyldopa, the exact mechanism and significance of which is not established. Incidence has varied from 10 to 20%. If a positive test is to develop it usually does within 12 months following start of therapy. Reversal of positive test occurs within weeks to months after discontinuation of the drug. Prior knowledge of this reaction will aid in cross matching blood for transfusion. This may result in incompatible minor cross match. If the indirect Coombs test is negative, transfusion with otherwise compatible blood may be carried out. If positive, advisability of transfusion should be determined by a hematologist or expert in transfusion problems.

Reversible leukopenia with primary effect on granulocytes has been seen rarely. Rare cases of clinical agranulocytosis have been reported. Granulocyte and leukocyte counts returned promptly to normal on discontinuance of drug.

Occasionally fever has occurred within the first three weeks of therapy, sometimes associated with eosinophilia or abnormalities in one or more liver function tests. Jaundice, with or without fever, may occur also, with onset usually within first 2 or 3 months of therapy. Rare cases of fatal hepatic necrosis have been reported. Liver biopsies in several patients with liver dysfunction showed a microscopic focal necrosis compatible with drug hypersensitivity. Determine liver function, leukocyte and differential blood counts at intervals during the first six to eight weeks of therapy or whenever unexplained fever may occur. Discontinue if fever, abnormalities in liver function tests, or jaundice occur.

Methyldopa may potentiate action of other antihypertensive drugs. Follow patients carefully to detect side reactions or unusual manifestations of drug idiosyncrasy.

Patients may require reduced doses of anesthetics when on 'ALDOMET'. If hypotension does occur during anesthesia, it usually can be controlled by vasopressors. The adrenergic receptors remain sensitive during treatment with methyldopa.

Hypertension occasionally noted after dialysis in patients treated with 'ALDOMET' may occur because the drug is removed by this procedure.

Rarely involuntary choreoathetotic movements have been observed during therapy with methyldopa in patients with severe bilateral cerebrovascular disease. Should these movements occur, discontinue therapy.

Fluorescence in urine samples at same wave lengths as catecholamines may be reported as urinary catecholamines. This will interfere with the diagnosis of pheochromocytoma. Methyldopa will not serve as a diagnostic test for pheochromocytoma.

Usage in Pregnancy: Because clinical experience and follow-up studies in pregnancy have been limited, the use of methyldopa when pregnancy is present or suspected requires that the benefits of the drug be weighed against the possible hazards to the fetus.

Adverse Reactions: **Cardiovascular:** Angina pectoris may be aggravated, reduce dosage if symptoms of orthostatic hypotension occur; bradycardia occurs occasionally. **Neurological:** Symptoms associated with effective lowering of blood pressure occasionally seen include dizziness, lightheadedness, and symptoms of cerebrovascular insufficiency. Sedation, usually transient, seen during initial therapy or when dose is increased. Similarly, headache, asthenia, or weakness may be noted as early, but transient symptoms. Rarely reported: paresthesias, parkinsonism, psychic disturbances including nightmares, reversible mild psychoses or depression, and a single case of bilateral Bell's palsy. **Gastrointestinal:** Occasional reactions generally relieved by decrease in dosage: mild dryness of the mouth and gastrointestinal symptoms including distention, constipation, flatulence, and diarrhea; rarely, nausea and vomiting. Pancreatitis and inflammation of the salivary glands may occur during therapy. **Hematological:** Positive direct Coombs test, acquired hemolytic anemia, leukopenia and rare cases of thrombocytopenia. **Toxic and Allergic:** Occasional drug related fever and abnormal liver function studies with jaundice and hepatocellular damage, (see PRECAUTIONS) and a rise in BUN. Rarely, skin rash, sore tongue or "black tongue". **Endocrine and Metabolic:** Rarely, breast enlargement, lactation, impotence, decreased libido; weight gain and edema which may be relieved by administering a thiazide diuretic. If edema progresses or signs of pulmonary congestion appear, discontinue drug. **Miscellaneous:** Occasionally nasal stuffiness, mild arthralgia and myalgia; rarely, darkening of urine after voiding.

Full information on dosage, contraindications, precautions, adverse reactions and references is available on request.

How Supplied: Film Coated Tablets 'ALDOMET' are yellow, film-coated, biconvex-shaped tablets, with the MSD symbol engraved on one side, and are supplied as follows:

Ca 8737—each tablet containing 125 mg of methyldopa, supplied in bottles of 100 and 500 tablets.

Ca 3290—each tablet containing 250 mg of methyldopa, supplied in bottles of 50 and 500 tablets.

Ca 8733—each tablet containing 500 mg of methyldopa, supplied in bottles of 50 and 250 tablets.

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19 years, as well as for the whole population of each county and for the entire province of Ontario.

The percentage of TONSADs performed by specialists and the percentage of anesthetics for the operations administered by specialists were calculated from a typical Ontario Health Insurance Plan (OHIP) billing for one month. These ratios were applied to the data for the whole year. The Ontario physicians' fee schedule¹² was employed in calculating the cost per TONSAD, and the average per diem charge for hospital stay allowed the approximate estimation of the total expenditure for the operation in Ontario for 1971.

Findings

In Ontario the age group 0 to 19 years constitutes 39% of the population. Eighty-eight percent of TONSADs in 1971 were performed on patients in this age group, a rate of 174 per 10,000 children 0 to 19 years, and 77 per 10,000 of the total population.

The distribution of TONSAD rates within the province ranged from a high of 307 (Elgin) to a low of 59 (Kenora), with no observable geographic pattern (Fig. 1). These numbers represent the operation rate for each county's residents regardless of where the operation was performed.

Of 59,413 TONSADs approximately 61% were performed by general practitioners and 54% of anesthetics were administered by general practitioners. The total amount paid by OHIP for physicians' services for TONSADs in one year amounted to 4.1 million dollars. The total number of bed days used by TONSAD patients in one year was 122,422, and calculated at the average cost per diem of hospital beds (\$59.88), the hospitalization cost of TONSADs was 7.3 million dollars. The total cost of physicians' services and hospitalization amounted to 11.4 million dollars in 1971.

Discussion

The TONSAD question has many aspects, both medical and economic. The TONSAD rates around the world and within countries vary so greatly that one must conclude that more than medical necessity determines the frequency of the procedure. The rate per 10,000 children under 15 years in Uppsala, Sweden is 17; in Liverpool, England the rate is 26; and in the New England states, 70.¹³ In Ontario the rate for the same age group is 200 and in British Columbia it is 107.¹⁴

When we consider this variation in practice and calculate the enormous

cost of the program, the TONSAD question merits comprehensive attention. Eleven and a half million dollars was spent in Ontario on this operation in 1971. The amount for the whole of Canada in 1971 was 25.6 million dollars for 161,301 TONSADs (using the average Ontario cost of \$159 per TONSAD).¹⁵

The time has come when we should weigh the practice against the results. Too often physicians schedule TONSADs out of habit or in response to parental pressure. The feasibility of doing these operations in outpatient departments¹⁶ and family-participation units has been demonstrated. There is a need for committees to conduct carefully controlled national studies on the indications for the operation, and to determine both the short- and long-term benefits and the hazards. The many uncertainties besetting TONSADs should be resolved once and for all so that we may get more for our health dollars spent for this purpose.

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References

1. COHEN DD, DILLON JB: Anaesthesia for outpatient surgery. *JAMA* 196: 114, 1966
2. BISHOP HF: Operating room deaths. *Anesthesiology* 7: 651, 1946
3. EVANS HE: Tonsillectomy and adenoidectomy, review of published evidence for and against the T & A. *Clin Pediatr* 7: 71, 1968
4. CRYSDALE WS: The present status of adenotonsillectomy. *Ont Med Rev* 39: 595, 1972
5. FEARON B: Pediatric adenoidectomy and tonsillectomy — divergent views. *Proc Can Otolaryngol Soc* 19: 89, 1965
6. WOOD BS, WONG YK, THEODORIDIS CG: Pediatricians look at children awaiting tonsillectomy. *Lancet* II: 645, 1972
7. REID JM, DONALDSON JA: The indications for tonsillectomy and adenoidectomy. *Otolaryngol Clin North Am* 3: 339, 1970
8. KAISER AD: Results of tonsillectomy: a comparative study of 2200 tonsillectomized children with an equal number of controls three and ten years after operation. *JAMA* 95: 837, 1930
9. VIANNA NJ, GREENWALD P, DAVIES JNP: Tonsillectomy and Hodgkin's disease. *Lancet* I: 431, 1971
10. Ministry of Health, Government of Ontario, November 1972 (by special request)
11. *Advance Bulletin, 1971 Census of Canada*, Catalogue 92-756 (AP-5). Ottawa, Statistics Canada, September 1972
12. Schedule of Fees, Ontario Medical Association, May 1971
13. PEARSON RJC, LOGAN RFL: Hospital case-loads in Liverpool, New England and Uppsala — an international comparison. *Lancet* II: 559, 1968
14. ROBINSON GC: Personal communication
15. Ministry of Health, July 1973, personal communication
16. CHIANG TM, SUKIS AE, ROSS DE: Tonsillectomy performed on an outpatient basis; report of a series of 40,000 cases performed without a death. *Arch Otolaryngol* 88: 307, 1968