Newborn circumcision: an economic perspective

David Cadman,*† MD, MSc, FRCP[C]
Amiram Gafni,‡ DSc
Jane McNamee,† MA

The purpose of this study was to analyse the hypothesis that prophylactic circumcision of male newborns is economically beneficial to the health care system in Canada. The minimal dollar benefits that would justify this conclusion were determined. The cost of the procedure was calculated in three Hamilton, Ont. hospitals and found to average about $38. The health benefits of circumcision are uncertain, but a review of the literature suggested that penile carcinoma is the most serious (and costly) disease potentially prevented by circumcision. Published estimates of the incidence rates, age at onset and costs incurred as a result of this disease were used in calculations of the per-case cost of prevention: $13.6 million. The authors conclude that the monetary benefits of circumcising newborns will not exceed this cost. It is proposed that the procedure be regarded as cosmetic surgery and be paid for by parents who wish the procedure carried out rather than by taxpayer-funded health insurance plans.

On analyse ici la question de savoir si la circoncision du nouveau-né, considérée comme mesure prophylactique, est économiquement rentable dans le régime sanitaire du Canada. On détermine d'abord le profit monétaire minimum qui justifierait une réponse affirmative. On constate ensuite que dans trois hôpitaux de Hamilton (Ont.) le coût moyen de l'intervention est de quelque 38 $. Malgré l'incertitude quant aux avantages sanitaires de la circoncision, une revue de la littérature donne à penser que parmi les maladies susceptibles d'être prévenues par cette intervention, la plus grave est le cancer de la verge. À partir de données déjà connues sur l'incidence de ce cancer, l'âge de son début et les coûts qu'il entraîne, on arrive à un coût de prévention de 13.6 millions de dollars par cas. Les auteurs concluent que les avantages monétaires de la circoncision du nouveau-né ne dépasseront pas cette somme. Ils proposent donc de la considérer comme une intervention esthétique dont le coût serait à la charge des parents qui la désirent plutôt qu'à celle des contribuables du régime d'assurance-maladie.

Should a policy of prophylactic circumcision be recommended for the newborn male population of Canada? Should taxpayers shoulder the costs of this procedure? In a review article Warner and Strashin' claimed that this procedure is a good policy for both health and economic reasons. The Fetus and Newborn Committee of the Canadian Paediatric Society has commented on the inadequacy of the data presented by these authors regarding health benefits and risks. Also, the American Academy of Pediatrics has stated that routine circumcision of newborn infants lacks medical justification. The purpose of this paper is to examine the evidence for economic benefits resulting from the procedure.

Two steps are required before any medical therapy or surgical procedure can be recommended as "good policy". First, the efficacy of the procedure must be established: Does it do more good than harm to those receiving it? The second step — economic evaluation — is usually indicated only for maneuvers of known efficacy.

The economic evaluation involves comparative analysis of the costs and consequences of alternative courses of action. Methods for such evaluation can be found in the works of Weinstein and Stason, Shepard and Thompson and Drummond.

The reality is that, in the near future, scientists are unlikely to resolve the question of the health efficacy of newborn circumcision. However, because the procedure is both widespread and publicly funded in Ontario, we propose a modified economic analysis to assist in clarifying the conclusions reached by Warner and Strashin. Costs can indicate the minimal, threshold amount of health benefit, measured in dollars, that would justify a procedure on economic grounds. The magnitude of this amount can be compared with benefits of other programs as an estimate of the likelihood of a procedure's being cost-beneficial.

Methods

The first step in assessing the cost—benefit of prophylactic circumcision of male infants younger than 10 days is to determine the dollar costs of the procedure to the health care system. We have conservatively assumed no medical or surgical complications in this analysis. We measured costs in all three Hamilton, Ont. hospitals where the procedure is performed (McMaster University Medical Centre, Henderson General Hospital and St. Joseph's Hospital).

The cost of physician billings was taken from the 1983 Ontario Health Insurance Plan schedule of benefits for physician services.

To determine the cost of the nurse assistant, we first estimated the time contributed and then converted the time units into monetary values. Although the amount of time varied from doctor to doctor, each hospital unit agreed that 30 minutes per circumcision represented a reasonable estimate. For each hospital the mean yearly salary of nurses involved in circumcisions was estimated, and benefits (20% to 30%) for 1983 salaries were assessed by the personnel supervisor. An estimate of

From the departments of *pediatrics and †clinical epidemiology and biostatistics, McMaster University, Hamilton, Ont., and ‡the Leon Recanati Graduate School of Business Administration, Tel-Aviv University, Tel-Aviv, Israel
Reprint requests to: Dr. David Cadman, Department of Pediatrics, McMaster University, 1200 Main St. W, Hamilton, Ont. L8N 3Z5
benefits per hour was then calculated and was added to the mean hourly wage; the sum was divided in half as the cost for 30 minutes.

A list of objects on circumcision trays was obtained from the supplies department at each hospital. Each item was costed by a consultant from American Hospital Supplies Ltd. The cost of processing, assembling, autoclaving and dispatching, also estimated by the supplies department of each hospital, was added. The total cost for each tray was calculated in 1983 dollars.

Costs of space and overhead dedicated to circumcision were calculated (Table I). The floor space for each procedure room was obtained from either the neonatal unit or the hospital engineering department using data available from an extensive cost-analysis survey carried out in 1978. This survey supplied total area per hospital, cost of plant operation, cost of housekeeping, cost of building depreciation and opportunity cost on building depreciation per hospital. The costs were summed for each hospital, and the total figure for the hospital was divided by the number of circumcisions that actually took place in that procedure room in the fiscal year 1978–79. To convert the 1978 figures to 1983 figures we employed a Statistics Canada price index.

Results and discussion

The average cost of performing neonatal circumcision varied from $36.55 to $41.82 in the three hospitals, with a mean of $38.32 (Table II).

These cost data can be regarded as generalizable to the Province of Ontario: physician billing, which is more than 50% of the overall cost, is constant, and the costs of the circumcision tray and nursing time are not likely to vary dramatically. The only component that may vary significantly is the cost of space and overhead of the circumcision procedure room. However, this cost is only 5% to 12% of the total cost. Thus, even if this cost in another locale were twice the amount calculated in Table I, the total cost would be increased only by 5% to 12%. Discussion with hospital administrators suggests that, overall, their time represents no more than 1% of the total cost of the procedure. Because determining the exact cost of their time from available hospital records is probably impossible, and our conclusions would not be changed anyway, we have omitted these figures.

Prophylactic procedures are an investment: the costs occur now and the benefits later. Warner and Strashin summarized the benefits of neonatal circumcision as facilitation of penile hygiene, prevention of carcinoma of the penis, decrease in the incidence of sexually transmitted disease, prevention of phimosis, paraphimosis and balanitis, and prevention of pain, psychologic effects and anesthetic risks associated with later circumcision.

The most serious disease that neonatal circumcision is claimed to prevent is cancer of the penis. Almost all cases of this disease occur in men older than 50 years. Therefore, for our analysis we conservatively used 50 to 60 years as the average age at onset. The incidence of penile carcinoma in this age group is 2/100 000 annually. Using these figures and data on the cost of circumcision one can calculate the minimal magnitude of benefits that would justify, on economic grounds, a recommendation to circumcise male newborns, assuming that the only benefit from circumcision is prevention of cancer of the penis.

The cost of circumcising 100 000 infants (without any complications) is just over $3.8 million. Invested at a 4% real interest rate (assuming no inflation), this amount would grow in 50 years to $27.2 million. If neonatal circumcision prevented both expected cases of cancer of the penis in this cohort, the real cost of preventing each case would be $13.6 million. Hartunian and colleagues have estimated that the average cost of treatment and foregone earnings for a case of cancer in a 50-year-old

<table>
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<tr>
<th>Hospital</th>
<th>Area (m²)</th>
<th>Costs ($)</th>
<th>Building depreciation ($/m²)</th>
<th>Circumcisions performed from April 1978 to March 1979</th>
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<td></td>
<td>Total</td>
<td>Procedure room</td>
<td>Plant operation</td>
<td>Housekeeping</td>
</tr>
<tr>
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<td>11.5</td>
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<td>1 341 335</td>
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<tr>
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<td>9.6</td>
<td>1 885 604</td>
<td>1 157 004</td>
</tr>
<tr>
<td>Henderson General</td>
<td>54 500</td>
<td>10.3</td>
<td>2 181 208</td>
<td>1 706 648</td>
</tr>
<tr>
<td>St. Joseph's</td>
<td></td>
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| Hospital        | Average costs |                           |                             |                                                        |            |                  |                             |
|-----------------|----------------|---------------------------|-----------------------------|--------------------------------------------------------|            |                  |                             |
|                 | MD billing     | Nurses' time              | Circumcision tray           | Space and overhead                                     | Total       |                  |                             |
| McMaster University | 21.25       | 8.67                      | 4.60                        | 7.30                                                   | 41.82       |                  |                             |
| Medical Centre    | 21.25       | 8.18                      | 4.70                        | 3.08                                                   | 37.21       |                  |                             |
| Henderson General | 21.25       | 7.88                      | 4.15                        | 3.27                                                   | 36.55       |                  |                             |
| St. Joseph's      | 21.25       |                           |                             |                                                        |            |                  |                             |

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man is $103,000. In other words, the “break-even” amount for prevention is more than 100 times the cost of disease.

Other diseases possibly prevented by circumcision, such as balanitis, paraphimosis and phimosis, are much less serious than penile carcinoma, and the effect of circumcision in terms of cases prevented is unknown. It is not reasonable to expect that the dollar benefits generated by prevention in these cases approach $13 million.

By comparison, the costs per case detected, diagnosed and treated (prevented) in a phenylketonuria screening program in New York State have been reported to be $38,000. Torrance and Zipursky have recently reported the cost of preventing Rh disease of newborns: antepartum treatment with anti-immunoglobulin was estimated to be $2,300 and $5,900 for primiparous and multiparous mothers respectively.

Warner and Strashin's second economic argument for performing neonatal circumcision is an annual saving of more than $5.3 million for Ontario and more than $18 million for all of Canada by prevention of later therapeutic circumcision for various health problems (other than carcinoma of the penis). They estimated that the cost of circumcising all newborn boys in the province would be $2.1 million and that the cost of 4,627 therapeutic circumcisions performed was $7.4 million. They merely subtracted the former cost from the latter in reaching an estimate of the net benefits. However, they overlooked the fact that the costs of prophylactic circumcision occur now and the costs of therapeutic surgery in the future. Future dollar savings must be discounted before they can be compared with present costs.

We conclude that the monetary benefits of a policy of circumcising male newborns to prevent penile cancer or later therapeutic circumcision will never exceed the costs and that such a policy cannot be justified on economic grounds.

A complete economic analysis would answer the following questions: Do the total economic benefits of the policy exceed the total costs? If they do, is a policy of allocating limited health care resources to the procedure a wise choice? That is, could the resources be more beneficially used in another way — for example, to promote immunization of children? Our analysis suggests that such an extensive cost–benefit analysis of circumcision is not warranted and that this procedure is not economically beneficial to the Ontario health care system or the taxpayers who fund the system.

If one considers only the strength of available evidence regarding health benefits and our economic analysis, then the public funding of neonatal circumcision through provincial health insurance programs is a policy of dubious merit. However, one must also consider the value that members of society place on having this service supplied as part of the health care system for reasons other than health and economic benefits.

As health advisers, individual physicians can attempt to rationalize decisions by making new parents aware of the health and economic facts. Both physician and parents should explicitly recognize that their decision about circumcision of a newborn is almost exclusively a choice based on their values and preferences.

The dilemma for the public policymaker is more difficult: Should the public pay out of limited resources for a procedure that is of unproved health benefit and almost certainly without economic benefit? Clearly the answer again depends on taxpayers' values and preferences (once they are fully informed of health benefits and economic costs), which must be balanced against the health benefits of using resources in another way.

The Canadian health care system has goals of equity in access to preferred care, effectiveness in health terms and efficiency in economic terms. On the basis of current information, the “equity” component of these goals is the only possible justification of publicly funded prophylactic newborn circumcision. To our knowledge this element has not been scientifically measured. We submit that, until demonstrated otherwise, prophylactic neonatal circumcision should be regarded as cosmetic surgery, paid for directly by parents wishing it, and that public health care dollars should be expended on preventive and therapeutic measures of more certain health or economic benefit.

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References