Wasted health care dollars: routine cord blood type and Coombs' testing
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Record Status
This is a critical abstract of an economic evaluation that meets the criteria for inclusion on NHS EED. Each abstract contains a brief summary of the methods, the results and conclusions followed by a detailed critical assessment on the reliability of the study and the conclusions drawn.

Health technology
Hemolytic disease of the new-born (HDN) was first studied retrospectively under an unrestricted policy of new-born cord blood testing (NCBT). Then, after a six month gap where policy was changed, HDN was studied again. This time, NCBT was prospectively restricted to patients in new-born intensive care units and normal new-borns with clinical jaundice or Rh-negative mothers, and/or positive maternal antibody screenings, or unavailable maternal blood testing.

Type of intervention
Primary prevention and screening.

Economic study type
Cost-effectiveness analysis.

Study population
New-borns.

Setting
Hospital. The economic analysis was conducted in Cleveland, Ohio, USA.

Dates to which data relate
The effectiveness and resource use data corresponding to the retrospective arm of the study included all 1989 admissions, while the prospective arm included all July 1990 to June 1991 admissions. The fiscal year was 1991.

Source of effectiveness data
Effectiveness data were derived from a single study.

Link between effectiveness and cost data
The costing was prospectively and retrospectively performed on the same patient sample.

Study sample
Power calculations were not used to determine the sample size. Patient selection was based on all new-borns (n=8,501) admitted to a medical centre in 1989, and between July 1990 to June 1991. There were 4,003 patients in the retrospective arm and 4,498 in the prospective arm. Neonates who were readmitted with jaundice were excluded if the jaundice was caused by other primary diagnoses, or if the study's selective NCBT intervention was precluded by the birth and new-born hospitalisation being at another hospital.
Study design
This was a non-randomised trial with historical controls. The study was based in a single medical centre. Duration of follow-up of the treatment cohort was defined as rehospitalisation for hyperbilirubinemia within one month of birth without another primary cause. Also, duration of hospitalisation was noted, and outcomes were evaluated at least monthly for adverse occurrences. No loss to follow-up was recorded. A national telephone survey confirmed the common practice of routine blood type and Coombs’ NCBT.

Analysis of effectiveness
The analysis of the clinical study was carried out on an intention-to-treat basis. The primary health outcomes were peak serum bilirubin levels, jaundice from HDN, adverse outcomes of neonatal jaundice, presence of ABO HDN, and Hobel risk scores for clinical severity of new-born hospitalisation.

Effectiveness results
No quantitative or qualitative increases in morbidity from jaundice were detected by either retrospective analysis with unrestricted NCBT, or prospective analysis with selective NCBT on new-borns. Each study arm resulted in 15 readmissions for jaundice (15 from 4,003 new-borns in the retrospective arm; and, 15 from 4,498 new-borns in the prospective arm). These included two patients with ABO HDN. Selective testing resulted in performance of NCBTs on only 390 infants in the 'normal' nursery (24% of the original sample). There was a significant difference between the retrospective and prospective groups in terms of new-born hospital stays, with the average stay being significantly less in the prospective study (1.7 versus 2.5 days; p=0.008). The groups were not significantly different by new-born Hobel risk scores (14 versus 14.5 in prospective and retrospective arms, respectively), duration of jaundice hospitalisations (2.1 days in both groups), or peak serum bilirubin levels (321 micro.mol/L (18.8mg/dL) versus 318 micro.mol (18.6mg/dL) in prospective and retrospective arms, respectively).

Clinical conclusions
Selective NCBT resulted in no adverse outcomes with neither morbidity nor mortality being adversely affected in this patient population. Thus, the authors argued that their data support the hypothesis that routine cord blood testing for normal new-borns is unwarranted unless the mother is Rh-negative and/or has a positive antibody screening or no maternal blood is available.

Measure of benefits used in the economic analysis
No summary benefit measure was identified in the economic analysis, and only separate clinical outcomes were reported.

Direct costs
Costs were not discounted due to the short time frame of the study. Direct costs included personnel costs (time in minutes and/or hours), hospital costs and patient charges. The annual rate of personnel assignment was based on 9 minutes per NCBT as published by the medical directors of laboratories. The full-time equivalent for technical personnel time was based on 2,080 hours/year. Relevant costs and charges on-site during the study were used for economic projections. Hospital costs were $7.27 per NCBT, while patient charges for cord blood testing were $19.75 per NCBT. The economic analysis was carried out in 1991, while the estimation of quantities was based on differences between the years 1989, and 1990-91.

Indirect Costs
Not considered.

Currency
US dollars ($).
Sensitivity analysis
No sensitivity analysis was performed.

Estimated benefits used in the economic analysis
Not applicable.

Cost results
The policy of selective NCBTs at the study institution resulted in savings of $8,745 in hospital costs and $23,759 in patient charges, plus 180 hours of technician time. Extrapolating these figures on a national basis could lead to projected savings of more than $11,357,000 of hospital costs and $30,853,000 of patient charges.

Synthesis of costs and benefits
A synthesis was not undertaken by the authors because the policy of selective NCBT resulted in cost savings and equivalent outcomes.

Authors’ conclusions
Selective NCBT decreases the use of resources and costs without apparent additional patient morbidity or mortality from HDN. Thus, the data from this study support the hypothesis that routine NCBT for normal new-borns is unwarranted unless the mother is Rh-negative and/or has a positive antibody screening or no maternal blood is available. If widely implemented, this protocol may yield substantial savings of health care dollars without compromising patient care.

CRD COMMENTARY - Selection of comparators
The reason for the choice of the comparator is clear.

Validity of estimate of measure of effectiveness
In assessing the internal validity of the effectiveness results the followings points should be considered: the study did not involve randomisation, and nor were the controls concurrent. However, potential biases resulting from this type of study design may have been partly alleviated by large sample sizes, and the fact that the comparisons were carried out at the same institution.

Validity of estimate of measure of benefit
Since the study lacked a summary benefit measure it may be regarded as a cost-consequences study.

Validity of estimate of costs
The economic analysis was limited to a brief description of resources used. Insufficient details were provided of the methods of cost estimation.

Other issues
In view of the lack of randomisation, sensitivity analysis, and statistical analysis of the costs, the results may need to be treated with some caution. The issue of generalisability to other settings or countries was not addressed.

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