Prenatal purified protein derivative skin testing in a teaching clinic with a large Hispanic population

Medchill M T

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
Performing tuberculin skin test by placing purified protein derivatives (PPD) in women who were delivered of infants. A chest X-ray film was ordered for patients with a positive screen; to ensure a negative chest X-ray result within 1 month of delivery, a repeat chest x-ray was performed late in pregnancy or immediately after birth; isoniazid prophylaxis was assumed to be used for the treatment of PPD positives.

Type of intervention
Screening and treatment.

Economic study type
Cost-effectiveness analysis.

Study population
Women, predominantly Hispanics, who gave birth in the clinic.

Setting
Outpatient obstetric clinic. The economic study was carried out in Arizona, USA.

Dates to which data relate
Effectiveness and resource use data corresponded to patients screened between 1 January 1993 and 31 December 1997. Some of the effectiveness data were obtained from studies published between 1993 and 1997. The fiscal year was not explicitly specified.

Source of effectiveness data
Effectiveness data were derived from a single study and a review of the literature.

Link between effectiveness and cost data
Costing was retrospectively performed on the same patient sample as that used in the effectiveness analysis.

Study sample
Power calculations were not used to determine the sample size. The study sample consisted of 1,763 patients. 54% of the sample were Hispanic and 38% were white.

Study design
Retrospective cohort study carried out in a single centre. The duration of the follow-up was within 1 month of delivery or until referral to a local tuberculosis clinic for isoniazid prophylaxis evaluation. No loss to follow-up was reported. 7.3% of the initial study sample did not undergo a tuberculin skin test. The placement of PPD was carried out when drawing up the initial prenatal profile.

**Analysis of effectiveness**
The principle used in the analysis of effectiveness was treatment completers only. The clinical outcome measures were the proportion of patients with positive skin tests from those who had their PPD both placed and read, the proportion of positive results in Hispanics, Asians, black patients, white patients, Native Americans, and the results of chest x-ray films regarding active disease.

**Effectiveness results**
The proportion of patients with positive skin test from those who had their PPD both placed and read was 15.2%; the proportion of positive results were: Hispanics 23.9%; Asians 31.3%; black patients 9.3%; white patients 4.1%, and Native Americans 0%. The relative risk for a positive PPD for Hispanics relative to Whites was 5.9 (3.9 to 8.8). The corresponding value for Asians was 7.6 (3.4 to 17.5). No significant differences were observed between black patients and Native Americans compared to white patients. Of the 345 chest x-rays conducted, none indicated active disease.

**Clinical conclusions**
It is not surprising that many of these patients have classical risk factors for tuberculosis. The most notable of these are ethnic minority status and being born outside of the USA in a country with a high tuberculosis prevalence.

**Outcomes assessed in the review**
Probability of having tuberculosis within the first 1 to 2 years after exposure and for the lifetime after two years, and the efficacy of isoniazid prophylaxis in reducing tuberculosis activation.

**Study designs and other criteria for inclusion in the review**
Not reported.

**Sources searched to identify primary studies**
Not reported.

**Criteria used to ensure the validity of primary studies**
Not reported.

**Methods used to judge relevance and validity, and for extracting data**
Not reported.

**Number of primary studies included**
3 studies were included.

**Methods of combining primary studies**
Not reported.
Investigation of differences between primary studies
Not reported.

Results of the review
The probability of having tuberculosis within the first 1 to 2 years after exposure was estimated to be 5% and for the lifetime after two years was estimated to be 5% (a conservative value of 4% was assumed). The efficacy of isoniazid prophylaxis in reducing tuberculosis activation was 71%.

Measure of benefits used in the economic analysis
The benefit measure was cases of tuberculosis potentially prevented because of the tuberculin skin test and subsequent treatment for the positives.

Direct costs
Costs were not discounted as they were incurred over a short period of time. Quantities were reported separately from the costs. Cost items were reported separately. The cost analysis covered the costs of the screening programme (including PPD, chest x-ray film, needle or syringe, technician's or registered nurse's time, and repeated PPD), isoniazid prophylaxis programme, and treatment for active tuberculosis. The perspective adopted in the cost analysis was not explicitly specified. The cost analysis was based on actual costs rather than billing charges. The date of the price data was not explicitly specified.

Indirect Costs
Not considered.

Currency
US dollars ($).

Estimated benefits used in the economic analysis
It was estimated that the use of tuberculin skin test and subsequent treatment for PPD positives could potentially prevent 6 cases of tuberculosis in the study group.

Cost results
The use of tuberculin skin test and subsequent treatment for PPD positives was associated with an overall saving of $57,628. The total cost of the screening programme was $12,446 for the study sample of 1763 patients, the cost of isoniazid prophylaxis program was $105.45 per case and the cost of treatment for active tuberculosis was $15,686 per case.

Synthesis of costs and benefits
Costs and benefits were not combined since the use of the screening programme was the dominant strategy.

Authors' conclusions
Because the highest incidence of tuberculosis is in people of reproductive age, an effective tuberculosis screening protocol during pregnancy would be valuable in reducing the incidence of tuberculosis nationally. Projected savings of this programme were $57,628.

CRD COMMENTARY - Selection of comparators
The reason for the choice of the comparator is clear. No screening was regarded as the comparator as this was common practice in the authors' setting before the introduction of the screening programme.

**Validity of estimate of measure of benefit**
The internal validity of the estimate of benefit can not be guaranteed due to the retrospective nature of the study design, and the apparent lack of a comprehensive literature review and quality assessment of the primary studies included in the review.

**Validity of estimate of costs**
Quantities were reported separately from the costs. Insufficient details of the methods of cost estimation were given. Cost results may not be generalisable to other settings or countries.

**Other issues**
In view of the lack of a prospective study design, and the absence of both sensitivity analysis and statistical analysis of the costs, the results may need to be treated with some caution. Appropriate comparisons with other studies were not made.

**Implications of the study**
Physicians should assess the PPD rates in their own populations to determine whether skin testing all patients or high risk individuals only is most appropriate (cost-effective).

**Source of funding**
None stated.

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