Breast feeding is related to C reactive protein concentration in adult women

M J A Williams, S M Williams, R Poulton

SHORT REPORT

Objective: To assess the influence of infant breast feeding on C reactive protein (CRP), a marker of low grade inflammation associated with cardiovascular mortality independent of serum cholesterol concentrations.

Design: Serum CRP, total cholesterol, anthropometric, and blood pressure measurements were performed along with assessment of infant breast feeding duration, birth weight, smoking status, adult socioeconomic status, number of health problems, and hormonal contraceptive use.

Setting: A New Zealand predominantly European descent community birth cohort.

Participants: 822 men and women aged 26 years.

Main results: There was a significant linear relation (p<0.001) between duration of breast feeding and adult CRP level in women. The geometric means (IQGR) for CRP were 2.22 (1.4, 4) mg/l for women breast fed for six months or more and 3.95 (2.8) mg/l for women not breast fed (ratio, 95% confidence interval [CI]: 0.69 to 0.87). The linear association between cholesterol and breast feeding was also significant (p=0.01), the geometric mean (IQGR) total cholesterol levels being 4.62 (4.10, 5.10) for those breast fed for six months or more and 5.04 (4.5, 5.80) for those not breast fed (ratio, 95% CI: 0.92 [0.87, 0.98]). There was no relation between CRP or total cholesterol and duration of breast feeding in men.

Conclusions: The findings of lower CRP with an increased duration of breast feeding in women suggest early postnatal nutrition may influence long term cardiovascular risk.

RESULTS

Table 1 details the characteristics of the study participants. Women had higher CRP levels than men but similar levels of serum cholesterol. There were no differences in adult waist girth, systolic and diastolic blood pressures for men or women breast fed for six months or more compared with the remainder of the sample.

There was no relation between infant breast feeding and CRP levels in men. In contrast there was a strong relation between duration of breast feeding for three or more months...
Breast feeding and C reactive protein

and lower CRP levels in women (table 2). A multivariate analysis adjusting for, birth weight, adult waist girth, smoking, adult SES, number of health problems, and hormonal contraceptive use showed infant breast feeding was independently associated with adult CRP levels in women. Waist girth and oral contraceptive use were also associated with CRP.

Women breast fed for six months or more had lower total cholesterol levels compared with women not breast fed, ratio 0.92, (95% confidence interval (CI): 0.87 to 0.98). Total cholesterol levels in men breast fed for six months or more were similar to the remainder of the study sample, ratio 0.99 (95% CI: 0.93, 1.04). The sex interaction for trend was not significant (p = 0.07).

Missing values

The 822 participants did not differ from the remainder of the sample for sex, birth weight, being before term (less than 37 weeks gestation), small for gestational age, SES at birth, or for the breast feeding categories used in this study. Differences in waist, systolic, and diastolic blood pressure at age 26 years were not statistically significant between this sample and those not included.

DISCUSSION

These results underscore the importance of infant nutrition as an influence on cardiovascular risk factors in adult life. Our findings confirm a previous study showing a relation between adult total cholesterol level and duration of breast feeding in women.3 Furthermore, we have shown that duration of infant breast feeding in women seems to favourably influence adult levels of CRP, a marker of low grade longstanding inflammation and predictor of long term cardiovascular risk.4 These findings extend those of previous reports where CRP concentration in adolescence was influenced by breast milk feeding in before term infants.5

It is unclear why the duration of breast milk feeding seemed to influence CRP levels in women and not men. The results do not seem to be influenced by differences in

<table>
<thead>
<tr>
<th>Duration of breast feeding</th>
<th>Men</th>
<th>Women</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number CRP* (mg/l)</td>
<td>Number</td>
<td>CRP* (mg/l)</td>
</tr>
<tr>
<td>None</td>
<td>203</td>
<td>1.80 (1, 3)</td>
</tr>
<tr>
<td>Less than 3 months</td>
<td>124</td>
<td>1.64 (1, 3)</td>
</tr>
<tr>
<td>3–6 months</td>
<td>49</td>
<td>2.14 (1, 4)</td>
</tr>
<tr>
<td>6 or more months</td>
<td>71</td>
<td>1.64 (1, 2)</td>
</tr>
<tr>
<td>p(trend) = 0.84</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Data are geometric mean (interquartile range). †Ratio compared with no breast feeding after adjustment for birth weight, adult waist girth, smoking, adult socioeconomic status, health problems, and hormonal contraceptive use. 2p Value for an interaction effect or difference between men and women = 0.006. 2p Value for an interaction effect or difference between men and women = 0.07.

What this paper adds

- C reactive protein (CRP) has been shown to be related to long term cardiovascular risk independent of serum cholesterol. Infant nutrition has been suggested to influence long term cardiovascular risk. In before term infants breast feeding seems to lower adult CRP levels, however it is unknown whether this effect is also seen in community based infant birth cohorts.
- This study shows that infant breast feeding is associated with lower adult CRP levels in women independent of anthropometric and blood pressure measurements, birth weight, smoking status, adult socioeconomic status, number of health problems, and hormonal contraceptive use. The findings suggest breast feeding should be encouraged with a possible benefit of reducing adult cardiovascular risk in women breast fed as infants.

Policy implications

Our findings suggest infant breast feeding should be encouraged to improve long term cardiovascular risk.
abdominal obesity as our analysis controlled for waist measurement. Similarly we controlled for serum cholesterol and other known influences of CRP levels. A potential explanation for the findings may relate to either the different hormonal milieu in adult men or women or alternatively different sensitivities to constituents of breast milk during early infancy. A limitation of the study was the use of a low sensitivity CRP assay and the absence of adjustment for a family history of cardiovascular disease or physical activity.

There is evidence that early postnatal nutrition can influence long term cardiovascular risk factors and the propensity for developing cardiovascular disease. It has been hypothesised that accelerated early growth may explain the adverse long term cardiovascular effects of a nutrient enriched diet in infancy. Breast fed infants have slower early growth and subsequently have a lower risk of multiple cardiovascular risk factors than formula fed infants. Our findings of lower CRP with an increased duration of breast feeding in women are consistent with the growth acceleration hypothesis.

Authors’ affiliations
M J A Williams, Department of Medical and Surgical Sciences, University of Otago, Dunedin, New Zealand
S M Williams, R Poulton, Department of Preventive and Social Medicine, University of Otago

Funding: data collection was supported by grants from the National Heart Foundation of New Zealand, the University of Otago (Otago Research Grant), NIMH Grants MH45070 and MH49414, and the WT Grant Foundation. The funding sources had no involvement in the performance of the study or the writing of the manuscript.

Competing interests: none declared

Correspondence to: Dr M Williams, Department of Medical and Surgical Sciences, University of Otago, 201 Great King Street, Dunedin, New Zealand; michael.williams@otago.ac.nz

Accepted for publication 17 October 2005

REFERENCES