SHORT REPORT

Testicular cancer risk in relation to use of disposable nappies

H Møller

Arch Dis Child 2002;**86**:28–29

Information on the use of disposable nappies in childhood was available for 296 testicular cancer cases and 287 population controls in Denmark. No association was found between disposable nappy use and the subsequent risk of testicular cancer in adulthood.

It has been hypothesised that the use of modern disposable, plastic lined nappies (diapers) could be an important factor in the increasing incidence of testicular cancer in adult age.¹ No information has been published about testicular cancer incidence in relation to such nappy use.

In Denmark, the age adjusted incidence of testicular cancer increased threefold over the period from 1945 to 1995. This increase in incidence was mainly attributable to increasing incidence in all age groups in successive birth cohorts born from the early 1940s to the early 1960s.² Men born around 1963 had an estimated 2.5-fold higher lifetime risk of testicular cancer than men born around 1943.

Information on the use of disposable nappies in male Danish infants born between 1946 and 1970 was collected in a case-control study of testicular cancer. These data were explored in order to investigate the hypothesis that the observed increase in testicular cancer incidence in Denmark was linked to the use of disposable nappies in this population.

MATERIALS AND METHODS

Briefly, the study identified all men in the Danish population born between 1946 and 1970 who developed testicular cancer in the period 1986–88 (the cases). Control subjects were sampled at random from the Danish population, using frequency matching on year of birth. We interviewed the men by telephone and mailed self administered questionnaires to their mothers. The questionnaires asked about the types of nappies that their son had used, but no question was asked about frequency of use or duration of use. We received questionnaires from the mothers of 296 cases and 287

controls. More detail on the study protocol has been published previously.³

RESULTS

Table 1 presents the results. The frequency of use of disposable nappies was strongly dependent on year of birth. Only two mothers of boys born before 1960 reported any use of disposable nappies; both boys were cases. Among controls born 1961–65, about 8% had used disposable nappies; this figure increased to about 24% in boys born 1966–70. This indicates the gradual introduction of disposable nappies in this population. The use of disposable nappies in cases was reported less frequently than in controls, both in the cohort born 1961–65 (4.3% *v* 7.8%) and in the cohort born 1966–70 (17.2% *v* 24.0%), and also in the entire material (3.4% *v* 3.8%). The computed odds ratios, which are estimates of the relative risk of testicular cancer in users of disposable nappies compared with non-users, were all below unity, indicating a lower risk of testicular cancer in users than in non-users. This finding is in contradiction to the proposed hypothesis.¹ It should be noted, however, that only four mothers reported that their sons (two cases; two controls) used disposable nappies exclusively. All other boys who used disposable nappies used them in addition to other types of nappies.

DISCUSSION

The present data do not provide the final proof or disproof of the hypothesis that use of modern disposable nappies increases the risk of testicular cancer. The available data refer essentially to the 1960s when disposable nappies gradually became more commonly used. The nappies used in the 1960s may well have been less tight and less hot than the types that are in use today. Furthermore, they were most commonly used in addition to other types of nappies. The present data are therefore not directly informative regarding the hypothetical risk of today's nappy types when used full time. Recall bias is a concern in any study where exposure data are collected retrospectively after the endpoint of interest has occurred. If mothers of cases thought of a link between disposable nappy

Table 1 Case-control study of testicular cancer risk in relation to use of disposable nappies in infancy

Year of birth	Cases (n=296)		Controls (n=287)		Odds ratio	95% confidence interval
	Used disposable nappies (%)	Did not use disposable nappies	Used disposable nappies (%)	Did not use disposable nappies		
1946–50	0 (0.0)	41	0 (0.0)	40	—	—
1951–55	1 (1.4)	73	0 (0.0)	73	—	—
1956–60	1 (1.2)	81	0 (0.0)	85	—	—
1961–65	3 (4.3)	67	5 (7.8)	59	0.5	0.1–2.3
1966–70	5 (17.2)	24	6 (24.0)	19	0.7	0.2–2.5
1946–70	10 (3.4)	286	11 (3.8)	276	0.8	0.3–2.0

use and testicular cancer, differential recall may bias the obtained result. The question of nappy use is factual and simple, and requires a minimum of interpretation. Therefore, this may not be a major concern. If any bias exists, it is perhaps most likely to be in the direction of a positive association, driven by better recall of disposable nappy use in mothers of cases than in mothers of controls.

The present data are informative on the hypothetical association between disposable nappy use, as it took place in the period 1946–70, and any risk of testicular cancer associated with this use. The relative risk of testicular cancer in users of disposable nappies compared to non-users was estimated to be 0.8 (95% CI: 0.3 to 2.0) and there is no empirical support to the idea that disposable nappies used in the period 1946–70 played an important role in the development of testicular cancer. Because of the limited study size and the low prevalence of use of disposable nappies in the study population, the study is not conclusively negative. The 95% confidence around the point estimate of 0.8 is wide (0.3 to 2.0), and not inconsistent with a moderate effect. So, although these data do not support the nappy hypothesis, they do not conclusively dismiss it either. For this a much larger study would be required.

The increase in testicular cancer incidence in Denmark was in particular dominated by the 2.5-fold increase in successive birth cohorts born from around 1943 to around 1963.³ In this period the use of disposable nappies increased from 0% to 8%. In the more recent period where the use of disposable nappies has become very common, it is clearly impossible to predict the outcome, because these boys have not yet reached the age where testicular cancer occurs. However, as has been shown

elsewhere, the increase in testicular cancer incidence in Denmark has been levelling off for birth cohorts born after around 1963²—that is, in the cohorts of boys where disposable nappy use has been increasing from about 8% to almost 100%.

In conclusion, the available evidence suggests that the recorded increase in testicular cancer incidence in Denmark is unlikely to be attributable to the increasing use of disposable nappies in this population. Firstly, in men born in the 1950s and 1960s, the prevalence of use of disposable nappies was not higher in men who subsequently developed testicular cancer than it was in other men. Secondly, the period of increasing incidence of testicular cancer did not correspond to the period where disposable nappies became commonly used.

Author's affiliations

H Møller, Thames Cancer Registry, King's College London, 42 Weston Street, London SE1 3QD, UK, and Cancer and Public Health Unit, London School of Hygiene & Tropical Medicine, Keppel Street, London WC1E 7HT, UK

Correspondence to: Prof. H Møller, Professor of Cancer Epidemiology, Thames Cancer Registry, King's College London, 42 Weston Street, London SE1 3QD, UK; henrik.moller@kcl.ac.uk

Accepted for publication 15 October 2001

REFERENCES

- 1 **Partsch CJ**, Aukamp M, Sippell WG. Scrotal temperature is increased in disposable plastic lined nappies. *Arch Dis Child* 2000;**83**:364–8.
- 2 **Møller H**. Trends in incidence of testicular cancer and prostate cancer in Denmark. *Hum Reprod* 2001;**16**:1007–11.
- 3 **Møller H**, Skakkebaek NE. Testicular cancer and cryptorchidism in relation to prenatal factors: case-control studies in Denmark. *Cancer Causes Control* 1997;**8**:904–12.