HEPATITIS-B VIRUS INFECTION IN ANAESTHETISTS

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SUMMARY

To determine whether anaesthetists are at risk from developing hepatitis-B virus (HBV) infection from their patients, 95 anaesthetists working with black South Africans (who have a high prevalence of hepatitis-B antigenaemia) were questioned about attacks of viral hepatitis and their blood was tested for hepatitis-B (surface) antigen (HBsAg) and antibody (Anti-HBs). Anti-HBs was detected in the serum of 17.9% of the anaesthetists, but none was a chronic carrier of HBsAg. Two anaesthetists had suffered from acute viral hepatitis during their careers, one of whom is now positive for Anti-HBs. Forty-five of the anaesthetists (47.4%) were known to have anaesthetized patients with HBs antigenaemia, and of these seven were Anti-HBs-positive. Anaesthetists working with a population having a high carrier rate of HBV appear to be more at risk from HBV infection than the general population.

The hepatitis-B (surface) antigen (HBsAg) is present in saliva (Heathcote, Gateau and Sherlock, 1974; Villarejos et al., 1974), other body secretions, and in the blood of chronic carriers of the hepatitis-B virus (HBV). Dentists come into close contact with saliva and blood in the course of their work, and they have been shown to be particularly at risk from infection by this virus (Feldman and Schiff, 1975; Moseley and White, 1975; Goubran et al., 1976). One might expect that anaesthetists would share the increased risk. If so, the danger of infection would be especially great in anaesthetists working with populations in which the carrier rate is high. Black South Africans have an overall prevalence of HBs antigenaemia of 9% (Bersohn et al., 1974; Macnab et al., 1976). We have questioned a group of anaesthetists working with such patients about a history of viral hepatitis and have examined their serum for the presence of HBsAg and antibody against HBsAg (Anti-HBs).

MATERIALS AND METHODS

Ninety-five anaesthetists working exclusively with black patients for a period of at least 5 months (mean duration 4.1 yr) took part in the study. There were 66 males and 29 females; their ages ranged from 24 to 74 yr (mean 35.2 yr). Eighty-three of the anaesthetists were white, nine were Asians, two were Eurafrican and one was black. Sixty-five worked in hospitals in the Transvaal and the remainder in Natal.

All those taking part in the study were interviewed and a questionnaire was completed. The details recorded included duration of work in medical practice and in anaesthesia particularly, type of patients anaesthetized, work in an intensive care area, and known contact with HBsAg-positive patients, jaundice patients, patients with chronic liver disease, or patients who had undergone renal transplantation or who were being treated by chronic haemodialysis. Questions were asked about a personal history of viral hepatitis or jaundice. None of the anaesthetists suffered from any chronic illness known to be associated with a high carrier rate of HBsAg, and none was a drug addict.

At the same time a sample of venous blood was taken for examination for HBsAg by solid phase radioimmunoassay with the Ausria 11-1 125 kit (Ling and Overby, 1972) and Anti-HBs using radioimmunoassay (Ginsberg et al., 1973) and passive haemagglutination (Vyas and Shulman, 1970). Positive tests for HBsAg were confirmed using the neutralizing antibody technique (Prince et al., 1973).

RESULTS

None of the anaesthetists was found to have HBsAg in the serum. Anti-HBs was detected in the serum of 17 (17.9%) of those studied. Of these 13 were white, three were Asians and one was Eurafrican. The prevalence (by radioimmunoassay) of HBs antigenaemia in white South Africans is 0.16%, while that of Anti-HBs is 5.3% (Kew et al., 1976). The difference between the prevalence of Anti-HBs in the anaesthetists and that in South African whites is significant ($P < 0.001$; Chi-square test). There was no obvious relationship to the sex of the doctor or to...
the province in which the doctor worked, although the anaesthetists working in Natal tended to have a higher titre of Anti-HBs than those in the Transvaal. The anaesthetists who were positive for Anti-HBs were older than their colleagues who gave a negative reaction (39.3 v. 34.2 yr; $P<0.05$). Although the individuals who were positive for Anti-HBs had worked longer as anaesthetists (mean of 5.4 v. 3.9 yr) and as doctors (mean of 13.7 v. 9.2 yr), these differences did not reach statistical significance. Fifty-six of the anaesthetists had worked in an intensive care area, and 12 of these were positive for Anti-HBs.

Two (2.1%) of the anaesthetists had suffered from acute hepatitis during their career as an anaesthetist. In neither was blood sampled at the time of the illness to detect the presence of HBsAg, but one is now Anti-HBs-positive. One further anaesthetist whose serum is now positive for Anti-HBs gave a history of having had an acute "influenza-like" illness in 1975 associated with a marked increase in the serum transaminase concentration but not jaundice. Unfortunately, blood was not sampled for HBsAg estimation until late in the course of the illness, when the result was negative. Forty-five (47.4%) of the anaesthetists were known to have anaesthetized patients with HBs antigenaemia. Of these, seven were Anti-HBs-positive. Three anaesthetists whose serum contained Anti-HBs had received blood transfusions, as had five of the anaesthetists who showed a negative reaction.

DISCUSSION

Both anaesthetists and dentists come into close contact with patients' saliva and blood. In addition, the former are likely to be exposed to mucus from the respiratory tract. Although anaesthetists wear surgical masks and do not use the sharp instruments or sprays (which may disseminate infectious material widely) used by dentists, they frequently administer i.v. injections, cannulate veins and sample blood. Moreover, they are more likely to deal with emergencies in which the patient's blood and mucus may be much in evidence. Dentists are known to be at an increased risk from infection by HBV (Feldman and Schiff, 1975; Moseley and White, 1975; Goubran et al., 1976). Our study suggests that anaesthetists working with patients having a high carrier rate of HBV are similarly at risk. Evidence of previous exposure to HBV in the form of detectable concentrations of Anti-HBs in the serum was present in 18% of the anaesthetists.

The danger of infection appears to be at least as great as that for dentists. In a recent study of dental surgeons and dentists dealing with both black and white patients in Johannesburg, 9.6% were found to be positive for Anti-HBs (M. C. Kew and G. M. Macnab, in preparation). Only two of the anaesthetists were known to have had acute hepatitis during their career as anaesthetists. In neither was blood tested at the time of the acute illness for the presence of HBsAg, but one is now positive for Anti-HBs. The discrepancy between the relatively high prevalence of Anti-HBs and the infrequency of known acute hepatitis in our study implies that the infection of the liver may occur without clinical manifestations. A similar discrepancy has been noted in dental surgeons (Moseley and White, 1975).

Fortunately, surgical operations are seldom performed on patients with acute viral hepatitis. Asymptomatic carriers of HBV and patients with certain chronic diseases associated with the presence of the virus constitute the more important hazard to anaesthetists. The prevalence of the former varies in different populations from 0.1 to 20%. In black patients from southern Africa the values (using counter immuno-electrophoresis) range from 2 to 16% in different parts of the subcontinent (Bersohn et al., 1974). Two recent studies using radioimmunoassay in black patients in hospital in Johannesburg showed that the population with which our anaesthetists were concerned had a frequency of 3.8-4.3% (Kew et al., 1976; M. C. Kew and G. M. Macnab, unpublished data).

Nearly one-half of the anaesthetists studied were known to have anaesthetized patients with HBs antigenaemia and seven of these were positive for Anti-HBs. Clearly it is not possible to screen every patient for the presence of HBsAg. However, patients with diseases known to be associated with an increased prevalence of the HBV carrier state should be screened if possible. Extra care should be taken when anaesthetizing such patients, and also when working with those populations having a high frequency of apparently asymptomatic HBs antigenaemia. The precautions which should be taken have been reviewed recently (Waterson, 1976).

There is some evidence that anaesthesia interferes with the afferent and, to a lesser degree, the efferent components of the immune response (Bruce and Wingard, 1971). The fact that none of the anaesthetists in the present study was HBsAg-positive argues against any significant disturbance in cell-mediated immunity arising as a result of chronic exposure to
anaesthetic agents. From this study it seems unlikely that there is a significant risk of transmitting HBV to patients.

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INFECCION VIRICA DE HEPATITIS-B EN LOS
ANESTESISTAS

RESUME
Afin de déterminer si les anesthésistes courent le risque d'être infectés par le virus de l'hépatite-B (HBV) à la suite de contamination par leurs malades, 95 anesthésistes travaillant avec des Sud-africains de race noire (qui ont une haute fréquence de cas d'antigénémie à l'hépatite-B) ont été questionnés sur les crises d'hépatite virale et leur sang a été testé pour voir s'il y avait des antigènes de l'hépatite-B en surface (HBsAg) et des anti-corps (Anti-
HBs). On a détecté la présence d'anti-HBs dans le sérum de 17,9% des anesthésistes, mais aucun d'entre eux n'était porteur chronique de HBsAg. Deux anesthésistes avaient souffert, au cours de leur carrière, d'hépatite virale aiguë, et l'un d'eux était maintenant positif pour les Anti-HBs. Quarante-cinq anesthésistes (47,4%) avaient anesthésié des malades atteints d'antigénémie HBs, et sept d'entre eux étaient positifs pour les Anti-HBs. Les anesthésistes travaillant parmi une population ayant une haute fréquence de porteurs de germes de HBV semblent être davantage exposés aux dangers d'une infection par les HBV que la population dans son ensemble.

HEPATITIS-B-VIRUSINFektION BEI
NARKOSEARZTEN

ZUSAMMENFASSUNG
Um festzustellen, ob Narkoseärzte Gefahr laufen, durch Infektion von ihren Patienten eine Hepatitis-B-Virusinfektion (HBV) zu entwickeln, wurden 95 Narkoseärzte, die mit schwarzen Süd-Afrikanern (mit hohem Vorkommen an Hepatitis-B-Antigenämie) arbeiteten, über Anfallen von Virushepatitis befragt, und ihr Blut wurde auf Hepatitis-B-Oberflächenantigen (HBsAg) und auf Antikörper (Anti-
HBs) untersucht. Anti-HBs wurde im Serum von 17,9% der Narkoseärzte entdeckt, doch war keiner ein chronischer Träger von HBsAg. Zwei der Ärzte hatten in ihrer Laufbahn an akuter Virushepatitis gelitten, und einer davon ist jetzt auf Anti-HBs positiv. Fünfundvierzig der Ärzte (47,4%) hatten mit narkotisierten Patienten mit HBs-Antigenämie zu tun gehabt, und sieben von diesen waren Anti-HBs-positiv. Narkoseärzte, die mit einer Bevölkerung arbeiten, die einen höheren Prozentsatz von HBV-Trägern besitzt, scheinen mehr Gefahr einer HBV-
Infektion zu laufen als die Durchschnittsbevölkerung.

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