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Tetanus antibodies at booking in a Nigerian obstetric population

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Abstract

Eighty-four consenting ante-natal patients at the University of Nigeria Teaching Hospital, Enugu, were examined for tetanus antibodies at booking. Only 28.6% had detectable serum antibodies. Although 73.8% were immunized within three years prior to investigation, only 37.1% had measurable antibodies. It was found that the longer the interval from previous immunization, the fewer the number with detectable antibodies and the lower the titres. Possible explanations for these findings are discussed and recommendations made.

Résumé

Quatre-vingt quatre malades prénatales a l' Université du Nigéria, Teaching Hospital, Enugu ont été examiné pour les anticorps tétaniques sur demande. Seulement 28.6% avait le serum anticorps détectable. Bienque 73.8% ont été immunisé trois ans environs avant l' investigation, seul 37.1% avait des anticorps measurables. On a trouve que le plus long l' intervalle de l'immunisation dernière, le moins les titres ou les quantités. Des explications possibles pour ces découvertes sont discutées et des récommendations sont faites.

Introduction

The administration of tetanus toxoid to pregnant women with a view to preventing neonatal tetanus is becoming a standard practice in many antenatal clinics in developing countries[1-6]. It is more likely for the neonates to be passively immunized if the administration of the tetanus toxoid is started early in pregnancy[5,7] or if the mothers have already been immunized prior to the pregnancy[2,3,8].

Unfortunately many Nigerian pregnant women are in the habit of booking late for their antenatal care and may not have enough time for adequate immunization against tetanus before term unless they are already sensitized or adequately immunized at booking so that a single dose of tetanus toxoid could give a booster effect. It has been shown that the booster effect in a sensitized individual usually occurs following a single vaccination[9-11].

It is important to know the percentage of patients who will benefit from booster immunization during their pregnancies. This information can be obtained by estimating the tetanus antitoxin level at booking. To the best of our knowledge, there has been no report of tetanus antibody status at booking in a Nigerian Obstetric population. Such a study will help formulate appropriate strategy to reduce or even prevent the incidence of maternal and neonatal tetanus in our population. For the same reasons, it will be relevant to know the sources of immunization for those with detectable levels of tetanus antitoxin.

Materials and methods

Pregnant women who registered for antenatal care at the University of Nigeria Teaching Hospital (UNTH) Enugu, Nigeria, were counselled to participate in the study. Eighty-four consecutive consenting patients were included in the study. Information were collected from the patients with regard to age, parity, the gestational age at booking, the date of the last tetanus toxoid immunization as well as evidence of current illness and drugs taken.

It was possible to place our patients into six socio-economic groups in descending order: The patients were aged between 17 and 36 years (mean: 25.1 years) while the parity ranged from 0-9 (mean: 2.9). The gestational ages at booking ranged from 13-34 weeks (mean: 23.5 weeks). Most of the patients had their last tetanus toxoid immunization during their previous pregnancies. We were unable to obtain complete information such as gestational age on ten of the patients. These was therefore excluded

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in the derivation of some of our results. None of the patients suffered from any illnesses during the study period. They were not on any medication except the antenatal drugs comprising calcium lactate, folic acid, ferrous sulphate and pyrimethamine which are given routinely to pregnant women at the UNTH, Enugu.

Clotted blood was collected from the 84 patients, the sera separated and stored at -20°C until analysed. Antibodies to tetanus were estimated in each of the sera semi-quantitatively by the haemagglutination method using "Vacci Test T-Pasteur" reagent from Diagnostic Pasteur, 3 Bd Raymond Poincare Marnes — Lar — Coquette, France. Serial dilutions of each serum sample were prepared in a microtitre plate and 25µl. of 1:5 dilution of the reagent added to each well and mixed. The mixture was incubated at room temperature for 45 minutes. To end point was the last dilution to give agglutination.

Results

The results of the tetanus antibody titres of all the patients studied are shown in Figure 1. Only 24 of the 84 patients (28.6%) had measurable tetanus antitoxin in their blood, although 62 of them (73.8%) admitted to having tetanus toxoid in the previous 3 years.

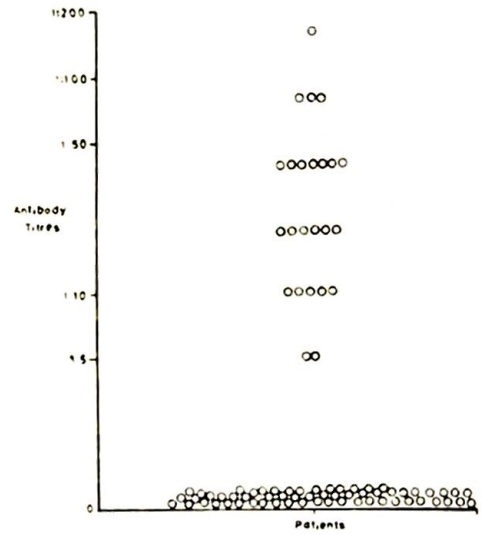

Fig 1: Tetanus antibody titres of the patients

Table 1: Relationship between booking antibody titres to the previous immunization dates of patients

S/No.	When Last Immunized	Total No. of Patients	No. With Detectable Antibodies	%	Antibody Titres Mean	Antibody Titres Range
1.	12 Months	20	8	40	1:63	1:20 - 1:160
2.	2 Years	27	9	33.3	1:31	1:10 - 1:80
3.	3 Years	15	6	40	1:12	1:10 - 1:20
4.	≥ 4 Years	12	0	0	—	—
5.	No memory of Previous Immunization	10	1	10	1:10	—

Table 1 shows the relationship of antibody titres of the patients to their previous immunization dates. Within the previous twelve months, 23.8% of the patients were immunized and of those 40% had detectable antibody levels in their blood with a mean titre of 1:63. Of the 32.1% who received immunization 2 years prior to their current pregnancies, 33.3% had measurable tetanus antitoxin levels in their blood with a mean titre of 1:31. Forty percent of the patients who were immunized three years before their current pregnancies, showed measurable antibody tires with a mean of 1:12. All the twelve patients (14.3%) who received tetanus toxoid four years and more prior to their current pregnacies had no detectable tetanus antitoxin at booking. Finally, ten patients (11.9%) had no memory of previous tetanus toxoid immunization. One of them (10%) had an antibody titre of 1:10

while the remaining nine had no antibodies. These findings show as would be expected that in general terms the longer the duration from date of immunization, the fewer the patients with detectable antibodies in their blood coupled with diminishing titres.

Discussion

The finding of only 28.6% of patients with measurable tetanus antibody levels in their blood at booking highlights the importance of a properly articulated tetanus toxoid immunization programme for the population in general and antenatal patients in particular. The situation is even more serious when it is considered that only 37% of those who received tetanus toxoid immunization within 3 years prior to booking had detectable antibodies. The study confirms in general that the longer the duration from previous immunization the lower the antibody titre. The finding that no patient who receive tetanus toxoid more than three years prior to this study had detectable antibodies at booking has important implications for our community since it is normally assumed that a full course of tetanus toxoid immunization confers immunity for up to five years[12,13].

At the U.N.T.H., Enugu antenatal patients are given two doses of 0.5ml. (75i.u.) tetanus toxoid with an interval of four weeks betwen doses. In a study of the response of patients to this regimen, it was found that patients with detectable tetanus antibodies at booking gave better response than those who had none[10]. In another study[11] it was also shown that the mean antibody titres in maternal blood and their corresponding cord samples were higher for patients with detectable antibodies at booking than those without.

The low percentage of patients with detectable tetanus antibodies in their blood at booking amongst those who were immunized in the previous three years may be related to the fact that people in the tropics have high incidence of low or non-responders to tetanus toxoid[5]. Certain infections common in our environment such as onchocerciasis[14] and tuberculosis[15] have been shown to depress immune response to tetanus immunization, although none of these infections was evident in our patients. Other possible explanations include the administration of low potency or inefficacious vaccines and the non-completion of the immunization schedule. The latter factor probably explains not only the low percentage of patients with detectable antibodies at booking with diminishing titres but also why none of those who were immunized more than three years prior to this study had detectable antibodies. In view of this low percentage of responders to tetanus toxoid immunization in our population the need for a fresh full course of immunization during every pregnancy cannot be over-emphasized.

The results of this study show that the mean gestational age at booking of the patients gave ample time for a full course of immunization. Patients who book late for antenatal care and can receive only one injection of toxoid are likely to respond adequately to tetanus toxoid administration if they are already sensitized from a previous immunization. It is therefore important that patients should book early to avail themselves of full course of immunization. This study has also confirmed that the longer the interval from previous immunization the fewer the number of patients with detectable antibodies and the lower the titres. This finding further emphasizes the need to give full course of tetanus toxoid during each pregnancy.

In conclusion, we strongly recommend that more intensive health education be given to women to make them aware of the importance of early booking for antenatal care. Besides other advantaes of early booking, this would afford them sufficient time for a full course of tetanus toxoid immunization schedule, the records of which should be given to them for safe-keeping. In the long run, it would be worth pursuing, on a national level the immunization of all women of child bearing age against tetanus every three years as this study has shown that antibodies against tetanus are not detectable after three years following immunization.

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