RESURGENCE OF MT MALARIA AMONGST TROOPS SERVING IN THE NORTH EAST

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ABSTRACT

Cases of MT malaria amongst troops serving in the North East are on the increase. Study of the malaria morbidity and mortality data of the past five years covering a population of about 1.65 lakhs revealed that there is a definite resurgence of malaria from an incidence of 0.39 per thousand in 1989 to 0.54 per thousand in 1992. Death due to malaria is a cause for concern especially since most of the troops are on chemoprophylaxis. A more realistic epidemiological approach to malaria control would be required to contain malaria.

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KEY WORDS : MT malaria-morbidity-mortality-resurgence

Introduction

The North-Eastern states are notorious for malaria and are classified as highly malarious areas (meso to holo-endemic) with 50-75 percent of the population infected with the agent [1]. Significantly MT malaria (malignant tertian) has surpassed BT malaria (benign tertian) in these areas and causes serious complications like cerebral malaria, algid malaria, black-water fever, etc. which cause significant morbidity and mortality [2]. Increasing number of cases of MT malaria are being reported in troops serving in the North-East, and a few deaths due to delayed diagnosis and treatment have also occurred [3]. This study has sought to look into some of the aspects of the rising trends and resurgence of MT malaria amongst troops.

Materials and Methods

The available data on malaria occurring in troops serving in the North-East during the past 4 to 5 years have been analysed and studied both at the Corps level as well as the Command level and suitable conclusions

drawn as to the trend of MT malaria in the North-East. Majority of the troops serving in the North-East are on chemo-prophylaxis with chloroquine (300 mg base) or amodiaquine (400 mg base) weekly under strict supervision.

The following working definitions were used in this study. *Fresh case* - Any new case showing clinical features of malaria and slide positivity for the parasite (BT or MT) with no previous history of proven malaria. *Local* - A fresh case of malaria occurring in a known malarious area with no history of movement outside the area in the past twenty one days (incubation period). *Imported* - A fresh case of malaria occurring in a non-malarious or malarious area within twenty one days of arrival from a known malarious area. *Relapse* - A case of BT malaria giving a definite history of having been treated earlier also for the same in the past three years. *Recrudescence* - A case of MT malaria giving a definite history of having been treated earlier also for the same in the past one year. *Mixed* - A case of malaria showing parasites of both BT and MT malaria in the blood smear.

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Results

Malaria morbidity in troops serving in the North-East : Incidence of malaria has been ranging from 0.09 per thousand to as high as 0.87 per thousand (Table 1). Incidence has been increasing from 0.39 per thousand in 1989 to 0.54 per thousand in 1992. Corps-wise incidence of malaria also shows that A Corps has a three-fold rise (0.32/1000 to 0.87/1000), B Corps an increase (0.59/1000 to 0.74/1000) and C Corps also an increase (0.19/1000 to 0.25/1000) during the last four years. Bengal Area and Meghalaya Area have also shown a rise in incidence. Monthly incidence of malaria in troops serving in the North-East during the past four years is

TABLE 1

Malaria morbidity rate (per thousand) during the past four years in troops serving in the North East

Formations	1989	1990	1991	1992
<i>A Corps</i> (Nagaland, Tripura, Manipur, Mizoram)	0.32	0.09	0.48	0.87
<i>B Corps</i> (Assam, Arunachal Pradesh)	0.59	0.45	0.52	0.74
<i>C Corps</i> (Sikkim, West Bengal)	0.19	0.16	0.19	0.25
<i>Bengal Area</i>	0.35	0.33	0.51	0.54
<i>Meghalaya Area</i>	0.44	0.54	0.50	0.54
<i>Independent Divisions</i>	0.36	0.55	0.30	0.39
Total	0.39	0.39	0.41	0.54

shown in Fig 1. It is evident that there has been an increase in malaria in 1991 and 1992 when compared with 1989 and 1990. Lowest incidence has been (0.10/1000) in February 1991 and highest in July 1991 (1.05/1000). Malaria season in the North-East seems to extend from May to November with peak incidence between July to September.

Malaria morbidity in troops serving in B Corps : Incidence of malaria has gradually increased over the years (Fig 2). Lowest incidence has been 0.07 per thousand in April 88 and highest incidence has been 1.62 per thousand in July 92. Even if the peak incidence of malaria in each year is compared it is obvious that peak incidence has been

Fig 1: Incidence of malaria (in troops) during the last four years

Fig 2: Incidence of malaria in troops of B Corps (Assam and Arunachal Pradesh) during the last five years.

gradually increasing (0.8 per thousand in Aug - Sep 88, 1.27 per thousand in Aug 89, 1.31 per thousand in July 91 and finally 1.62 per thousand in July 1992. There was a slight fall in Aug 90).

Breakdown of malaria cases in B Corps for the year 1992 has been shown in Table 2. It is evident that 51.67 percent (39.71% local and 11.96% imported) of the total cases were MT malaria and 44.26 percent (25.36% local and 18.90% imported) were BT malaria. Majority of the MT malaria cases and more than half of BT malaria cases were fresh local. Only a

TABLE 2

Breakdown of malaria cases of B Corps (1992)

Month	Fresh Local	MT Fresh Imported	Fresh Local	BT Fresh Imported	Relapse/ Recrudescence	Mixed	Total
Jan	7	5	2	-	3	-	17
Feb	6	3	-	2	1	-	12
Mar	-	-	3	2	-	-	5
Apr	6	-	6	5	-	-	17
May	10	6	13	10	1	-	40
Jun	9	3	8	15	1	-	36
Jul	36	4	39	16	2	1	98
Aug	17	5	15	10	1	-	48
Sep	13	7	7	11	2	-	40
Oct	25	12	6	6	2	-	51
Nov	18	1	5	-	1	-	25
Dec	19	4	2	2	2	-	29
Total	166	50	106	79	16	1	418
%age	39.71	11.96	25.36	18.90	3.83	0.24	100

small percentage (3.83%) of the total cases were due to relapse/recrudescence while only one case was due to mixed infection (BT & MT). Malaria transmission season was between May to October with a significant peak in the month of July (98 cases). The high incidence during the month of July was due to an epidemic outbreak of malaria in one of the Divisions of this Corps.

Mortality due to Malaria : Mortality due to MT malaria continues to pose a serious health problem to troops serving in the North-East. Formationwise mortality due to malaria during the past four years is shown in Table 3. From the data it is evident that the mortality varied from 0.28 per lakh per year to 0.40 per lakh per year. Highest mortality occurred in A and B corps which are located in holoendemic areas and many of their troops are located in remote and relatively inaccessible areas. Most of the deaths occurred due to complications of MT malaria like cerebral malaria, renal failure and algid malaria. Delay in diagnosis and treatment at the periphery was the main cause of mortality in these cases.

Entomological studies : Entomological studies by Defence Research Laboratory (DRL) at Tezpur have revealed that a relatively high mosquito density was present in some

TABLE 3

Mortality rate (per lakh) due to malaria in troops in the North-East during the past four years

Formations	1989	1990	1991	1992
A Corps (Nagaland, Tripura, Manipur, Mizoram)	0.97	2.70	1.55	0.75
B Corps (Assam, Arunachal Pradesh)	0.47	0.30	0.30	0.35
C Corps (Sikkim, West Bengal)	0.11	-	-	0.14
Bengal Area	-	-	-	-
Meghalaya Area	0.51	-	-	0.65
Independent Divisions	-	0.80	-	0.76
Total	0.34	0.39	0.28	0.40

of the regions of the North-East. Range varied from 92 ptn to 936 ptn (per trap night) with peak biting hours from 2000 hrs to 2400 hrs. Vectors of malaria encountered state-wise were :- Assam - *Anopheles annularis*, *A.philippinensis*, *A.minimus*, *A.culicifacies* and *A.fluviatilis*; Arunachal Pradesh - *A.culicifacies*; Tripura - *A.philippinensis* and *A.minimus*; Mizoram - *A.minimus*; Nagaland - *A.culicifacies*; Manipur - *A.minimus*; and Meghalaya - *A.annularis*, *A.culicifacies*, *A.fluviatilis* and *A.philippinensis*.

Most of the vectors were resistant to DDT but susceptible to malathion. This resistance

has also been reported by other workers [4].

Discussion

Morbidity and Mortality

Analysis of the data presented shows that cases of malaria amongst troops serving in the North-East are on the increase. From a low of 0.39 per thousand in 1989, malaria incidence has risen to 0.54 per thousand in 1992. Highest incidence occurred in July 1991 (1.05/1000). This increase is also evident on analysing the data at the Corps level. Peak incidence in B Corps gradually doubled from 0.8 per thousand (Aug-Sep 88) to 1.62 per thousand in July 1992. Breakdown of malaria cases in B Corps during the year 1992 also revealed that almost 50 percent of the malaria cases were MT malaria of which a large majority were infected locally.

These rates though much lower than the high incidence in the local population where 50 to 75 percent of the population are infected, are still a cause for concern. The fact that despite all preventive and control measures including chemoprophylaxis [5,6], there is no significant fall in the incidence of MT malaria, is alarming.

A significant proportion of deaths occurred due to complications of MT malaria. On an average about seven deaths per year occurred in the North-East. This is significant considering that the major thrust of the *P.falciparum* containment programme in the Modified Plan of Operations is to prevent mortality due to malaria [7]. Prospects of controlling, let alone eradicating malaria seems therefore to be quite grim.

Suggested approach to malaria control :

Due to extensive variations in the malaria intensity and response to control interventions a sound epidemiological approach to malaria control is required in the North-East [8]. Insecticide spraying and mass chemoprophylaxis are usually very effective in controlling malaria but unless maintained the problem returns to original endemicity. This seems to be the cause of the resurgence of malaria in Armed Forces in the North-East.

Some of the measures recommended to control malaria are :

- (i) The Army being a disciplined and highly motivated force it is relatively easier to implement affordable and practical antimalarial measures like use of DMP oil while on night duty, wearing of long sleeved shirts, use of mosquito nets, and most important of all chemoprophylaxis regularly every week throughout the stay in the North East.
- (ii) There is still a requirement to reorganise malaria control programmes by decentralisation of activities, proper distribution of hygiene chemicals, improved training of anti malaria squads, rapid investigations and control of outbreaks, and health education of troops.
- (iii) Intensive field based research is required to be carried out on malaria epidemiology, vector control, chemotherapy and insecticide resistance.
- (iv) Drug resistance of *P.falciparum* to 4-aminoquinolones in the North East has been reported in the army also [9]. Very few breakthrough cases of MT malaria have been reported and such cases are usually due to irregular drug intake. Test for RI, RII, RIII resistance to chloroquine should be routinely carried out even though most physicians prefer to directly treat cases with quinine rather than wait for complications of MT malaria to develop (which may be justifiable).
- (v) Chemoprophylaxis exerts drug pressure on the malaria parasite but when the individual/unit leaves the North East, one time radical treatment is imperative or else large outbreaks of malaria will occur and cause transmission of the parasite to non-endemic parts of the country.
- (vi) Frequent movement of troops on leave, temporary duty, turnover of units especially from non-malarious areas to endemic areas results in resurgence of malaria.
- (vii) Health education of troops regarding the problem of malaria, signs and symptoms,

complications, mode of transmission, prevention and control serves to improve the KAP (knowledge, attitudes and practice) of individuals and is one of the most potent methods of controlling malaria.

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