

## **Medical Department Report of XXVI ISEA Dec 2006-April 2008**

**Surg. Lt Cdr IB Udaya, NM**

- 1) A total of 431 medical cases were handled from the beginning of the expedition till the completion. This includes the sick report attended during the onward transit from Goa to Antarctica onboard Emerald Sea, during our stay in Maitri, convoys, and during return journey.
- 2) Most of the cases were minor in nature. The increase in the sick report was observed while on board MV Emerald Sea. Minor abrasion, contusion and lacerations were managed during the transit. Common infective cases were on higher side onboard when compared to incidences while at Maitri.
- 3) Almost all the cases responded well to the medicines which were carried along with the expedition team. It was an interesting fact that some of the summer members had elevated blood pressure. There were very few reported cases of cold injuries during the entire expedition.
- 4) The most common medical cases which were encountered during winter over were abrasions, sprains, mouth ulcers, constipation, folliculitis, dandruff, contusions, bruises, psychological changes etc.

### **Monitoring the Vital Parameters of the Expedition Members**

- a) The vital parameters such as Pulse rate, Blood pressure and Respiratory rate were measured every week. The data recording began eight days prior to launch of expedition till the completion of the expedition. Vital parameters of summer & winter members were recorded separately for easy interpretation.
- b) Other Medical Investigations like Haemoglobin estimation, Pulmonary function test, cognition test, memory test, serum samples for immunoglobulin variations and Heart rate variability data recording were carried out once every four months.

**Few Medical Emergencies Managed during the Wintering over Period Include:**

- a) Handling a case of Acute Hypothermia due to immersion of Mr. Ram Barkai, a tourist to Antarctica in a semi frozen Lake. He hails from Israel but settled in South Africa.
- b) Nn Sub Tejram who lost his bearing in the Ice shelf during the Third Indian Antarctic convoy was resuscitated from hypothermia and psychological shock.
- c) Angina case was diagnosed and handled in a summer member who had come to Antarctica from GSI for carrying out Geological Investigations from Troll station.
- d) A member with Suicidal tendency was counseled and motivated to resume his duties. Anti anxiety therapy was started with the strong support of the team leader and other fellow members.
- e) Second degree Hemorrhoids with fissure in Ano case was managed conservatively.

**Status of Medical Stores**

- a) Medical store stock status and the shelf life were taken into account and drugs were procured to cater to even unforeseen medical emergencies at Antarctica and during transit. Few day care anesthesia drugs, plasma expanders, Digital BP apparatus, newer antibiotics were added to the Expeditions medical inventory.
- b) Unserviceable medical equipments like Boyle's apparatus, Manual BP apparatus, Infra red light lamp etc., were back loaded so that it can be replenished at the earliest.
- c) Expired drugs / chemicals were back loaded safely.

**Operational OT**

The OT equipments like various types of Artery forceps, scalpels, retractors, tissue clamps, tissue holders etc. were sterilized using pressure autoclave machine. The OT was rigged as per surgical norms to be prepared for any type of medical/surgical emergencies. Non operational Boyles machine was back loaded and NCAOR was informed so that Automatic Anesthesia machine (with ventilator function) can be procured and sent to Maitri at the earliest.

## Radiography

A total of 08 X-rays were taken despite the limitations, out of which only two were developed adequately.

## Significant Findings/Observations

- a) Minor injuries and common infections like Upper respiratory tract infection were common during ship journey.
- b) Mouth ulcers, dandruff, constipation and flatulence were the frequent complaints of expedition members during wintering.
- c) Body weight of expedition members increased up to 10-20% in the first 8-9 months of stay in Antarctica.
- d) Psychological changes like anxiety, irritability, over confidence, depression, and invulnerability were seen in few members.
- e) Haemoglobin levels decreased marginally in wintering members till December. Later reached normal value, which may be attributed to fresh fruits and vegetables, and increase in Vit 'C' intake.

## Suggestions

- a) **Life style modifications** such as regular physical conditioning, yoga and indoor games will not only prevent the incidence of overweight, psychological effects due to prolonged isolation and other health hazards but also promote healthy social environment and team spirit.
- b) **Automatic anesthesia machine/Ventilator** has to be procured and the oxygen generation system or Gaseous oxygen supply has to be provided in order to deal with any surgical or medical emergencies.
- c) Apart from the general cardiac drugs, **Cardiac emergency tray** (various drugs) as per the guidelines of American Heart Association has to be there in Maitri MI Room.
- d) At least two **Central venous catheters** and Femoral vein catheter may be included in the yearly medical store indent/inventory.
- e) The existing X-Ray machine at Maitri may be replaced with a **Digital X-Ray machine**. This will greatly help doctors in diagnosing musculoskeletal and various other disorders. In most of the occasions we are dependent on Russian X-Ray Machine due to combination

of various reasons like, the medical officers not being trained in techniques of radiography or the film developing chemicals are out of date or the films are mistakenly exposed to sunlight or chemicals and films would have undergone some chemical degradation due to constant exposure to very low ambient temperature, etc. A Digital X-Ray machine would give an instant image on the screen which can be saved, thus eliminating laborious and time consuming procedure of developing X-Ray films.

### **Medical Research Carried out during XXVI ISEA is as follows:**

#### **Heart Rate Variability Study**

A prospective study on heart rate variability with respect to cold climate and prolonged isolation has been carried out on all wintering members. ECG (portable) machine has been used on subjects to record the data. The data are being analysed in detail at National Institute of Mental Health and Neurosciences. This will reveal the physiological changes in the heart due to exposure to cold climate.

#### **Haemoglobinometry (Hb)**

Haemoglobin levels of all wintering members were measured by Sahli's Haemoglobinometer once in two months to monitor haemoglobin level changes due to– i) persistent exposure to cold temperature, and ii) due to changes in food habits.



*a) Heart rate variability study*

### Measurement of Lung Volume and Lung Capacity Changes

Lung volume and lung capacity of all wintering members have been recorded using digital hand held Spiro meter which in turn was connected



*b) Measurement of lung volume and lung capacity changes*



*c) Study in the field of immunology*

to a computing machine. This revealed the vital lung volume and capacity changes in the people who have stayed here for more than 12 months. These changes may be accountable to cold climate, lack of physical exercises.

### **Study in the field of Immunology**

Serum samples of all wintering members were collected for immunological studies. The changes in the immunoglobulins studied in parallel with other studies carried out will revealed variations in different immunoglobulins (IgG, IgM, IgA, IgD, and IgE). These changes would further indicate which immunoglobulin was affected most due to isolation, stress, and prove association of immunoglobulins in decreasing immunity due to prolonged stay in Antarctica (sterile conditions).

### **Study of Changes in Behavioural Psychology, Intelligence and Memory**

WHO approved tests have been carried out on all wintering members to know alterations in their psychology. These tests were carried out once every five months. The base line data were recorded at Goa before team's departure to Antarctica. Variations in psychology, intelligence and memory obtained after completion of this study could be studied along with immunoglobulin changes so that the results will be helpful in future lengthy expeditions and space voyages.

### **Measurement of Vital Parameters**

Vital parameters like Blood pressure, Pulse rate and duration of sleep of all wintering members were being recorded regularly to derive Mean Arterial Pressure. Apart from this body weight, Mid Arm Circumference (MAC), Skin Fold Thickness (SFT) were recorded every third week to know changes in metabolism, Body Mass Index (BMI) and to prevent life style diseases like obesity, hypertension, diabetes, cardiac disorders etc., in lengthy expeditions.

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