IMMUNOLOGY RESEARCH DIVISION

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During the year under report, the Immunology Research Division was mainly involved in communicable diseases such as Tuberculosis, Viral Hepatitis, Sexually Transmitted Infections and non- communicable diseases such as cancer including cervical cancer by cervical cytology screening and diabetes mellitus.

RESEARCH PROJECTS

1. COMMUNICABLE DISEASES

1.1. TUBERCULOSIS

1.1.1. Detection of Diabetes Mellitus (DM) in Pulmonary Tuberculosis Patients

Diabetes mellitus contributes to 1.5 million of all annual deaths. Ageing, rapid unplanned urbanization, and the globalization of unhealthy lifestyles attribute to the increased incidence of diabetes mellitus. In recent years, especially in the developing countries, the prevalence of tuberculosis (TB) and diabetes mellitus (DM) is increasing. The relationship between these two diseases is re-emerging as a significant public health problem. If these two diseases co-exist, more complex treatment regimes are required to control both diseases and treatment failures. Early detection of diabetes mellitus in pulmonary tuberculosis patients will help improved care and control of both diseases. The cross-sectional descriptive study was conducted at the National TB control Centre Latha and Aung-San, Yangon in collaboration with National TB Control Programme, Yangon. A total of 86 confirmed pulmonary tuberculosis patients, with a mean age of 42.42 ± 15.61 year were recruited and 45/86 (52%) were male. Pulmonary TB was confirmed by sputum microscopy, chest X-Ray and GeneXpert. All of the patients have active pulmonary lesions in chest X-Ray. Mean BMI of the patients was 19.31 ± 7.5 kg/m^2. Among the TB patients, 55/86 (63.9%) were new cases, 18 (20.9%) were registered as re-treatment cases and 13 (15.1%) were multidrug resistant TB cases. Diagnosis of diabetes mellitus was carried out by Random blood sugar and glycated haemoglobin (HbA1c) testing. Patients with random blood sugar ≥ 120 mg/dl were further tested for HbA1c. Diabetes was diagnosed in 22 (25.5%) (HbA1c ≥ 6.5%) and pre-diabetes was in 14 (16.2%) (HbA1c 5.7-6.4%). Mean HbA1c of diabetes patients were 9% and pre-diabetes were 6%.

1.1.2. Usefulness of PCR as a diagnostic tool for extra–pulmonary tuberculosis among clinically suspected inpatients at Medical Unit 1, Yangon General Hospital

A cross sectional descriptive study was carried out among suspected extra–pulmonary tuberculosis (EPTB) inpatients at the Medical Unit 1, YGH. After taking informed consent,

the demographic data of each patient was recorded with a proforma and 3 to 7 ml of the commonest biological samples of suspected EPTB was collected during routine aspiration procedure with sterile containers and transported to laboratory immediately after the collection. Biological samples of suspected EPTB were 8 samples of pleural fluid, 11 samples of ascitic fluid and 11 samples of CSF. DNA extraction was done by the TB Bead solution method with the manufacturer's instructions and PCR was performed with primers targeting IS 6110 and the PCR products were demonstrated by 2% agarose gel electrophoresis. EPTB was detected in 4 samples (3 pleural fluid and 1 ascitic fluid) by PCR.

1.2 VIRAL HEPATITIS

1.2.1 Sero-prevalence of Hepatitis B and C viral infections among haemodialysis patients in 500 bedded Yangon Specialty Hospital

Patients on chronic hemodialysis are at increased risk of hepatitis B and C viral infections. These patients have an increased tendency to become chronic carriers and also to be a potential reservoir for its transmission, possibly contributing to the nosocomial spread in dialysis centres. In addition, hepatitis B and C seem to increase the mortality rate in this group of patients. To identify the challenges of infection control standards for prevention of blood borne infections including HBV and HCV, we tested the magnitude of these infections among haemodialysis patients in 500 bedded Yangon Specialty Hospital in 2016. A cross sectional descriptive study was carried out among haemodialysis patients in the Department of Renal Medicine, 500 bedded Yangon Specialty Hospital. After taking an informed consent, all participants completed the demographic characteristics, haemodialysis history and risk factors. A total of 111 patients were tested for HBs antigen and anti-HCV antibody by one step qualitative immunochromatographic assay (Standard Diagnostic Inc, Korea). Sensitivity of HBs Ag test kit is 100% and specificity is 100% (2003 WHO Evaluation report). Sensitivity of anti HCVtest kit is 100% and specificity is 99.4% which capture recombinant HCV Core, NS3, NS4, and NS5 Ag.

Sero-prevalence rates for hepatitis B and C viral infection were 7.2% and 15.3% respectively. Two out of 111 patients had both HBV and HCV. The mean age (±SD) of the study population was 48 (±14.6) year and 57% were male gender. The positivity of HBV or HCV did not differ by gender and age group. Mean frequency of haemodialysis in patients with HCV was significantly higher than that of HBV patients ($p=0.02$). Mean (±SD) duration of haemodialysis was 21.7 months (±2.42). All patients previously attended other haemodialysis units. Factors significantly related to high HCV infection were duration and frequency of haemodialysis and history of blood transfusion. Only 44.1% (49/111) of patients reported the history of complete HBV vaccination. The HBV positivity (7.2%) among haemodialysis patients in this study was more or less similar to general population (6.5%) but the prevalence of HCV infection (15.3%) among haemodialysis patients in this study was remarkably higher than that of general population (2.7%). It was highlighted that the screening and treatment strategies of these viral infections among high risk groups are needed to reduce the morbidity and mortality due to HBV and HCV infections.

1.2.2 Hepatitis B and C viral infections among multi-transfused patients in Department of Clinical Haematology, Yangon General Hospital

The transfusion-dependent patients are particularly at risk of acquiring Hepatitis B (HBV) and hepatitis C viral (HCV) infections. This study was undertaken to estimate the prevalence of HBV and HCV infections in multi-transfusion (≥10 blood units transfused) patients. A cross-sectional descriptive study was conducted in Department of Clinical

Haematology, Yangon General Hospital in March 2016. A total of 156 multi-transfused patients were tested for HBsAg and anti- HCV by one step qualitative immune-chromatographic assay (Standard Diagnostic Inc, Korea). Sensitivity of HBs Ag test kit is 100% and specificity is 100% (2003 WHO Evaluation report). Sensitivity of anti HCVtest kit is 100% and specificity is 99.4% which capture recombinant HCV Core, NS3, NS4, and NS5 Ag. The mean (±SD) age of the study population was 32.5(±18.1) year and 64.1% were male gender. About 46% of patients were 13-30 years age group, followed by 28.2% of 30-50 years age group, 17.9% of >50 years and children <13 years constituted about 7.7%. The diagnosis of study populations mainly included leukemia cases (n=45), thalassaemia cases (n=38) and haemophilia (n=37). The blood group transfused were group B (38.5%), O (29.5%), A (24.4%) and AB (7.1%). The duration of blood transfusion varied from one month to 46 years. About 53% (83/156) of patients had over one year duration of blood transfusion. Sero-prevalence rates for HBV and HCV were 7.1% (11/156) and 2.5% (4/156) respectively. There was a statistically significant difference (p=0.02) between total mean units of blood transfusion in HCV positive and negative patients (100.1±71.2vs39.3±49.2). Total mean units of blood transfusion in HBV positive patients (63.2±114.7) was higher than that of HBV negative patients (39.2±42.3) (p=0.129). Duration of blood transfusion was significantly related to HCV positivity (241.5±220.8 months vs 71.7±103.7 months) (p=0.002) but not in HBV positivity (93±94.5 months vs 74.8±111.6 months) (p=0.60). Only 14 patients gave history of complete HBV vaccination, and 6 patients gave incomplete HB vaccination. Ten out of 11 HB positive patients had no history of HB vaccination and one positive patient had two times of HB vaccination. Regarding the risk factors, there were no significant associated factors in this study. Findings highlighted that the screening and complete HB vaccination among multi-transfused patients should be carried out for prevention and control of those infections.

1.3. SEXUALLY TRANSMITTED INFECTIONS

1.3.1. Prevalence of abnormal cervical cytology and associated genital infection in women attending ART Clinic, Insein General Hospital (2016)

The frequency of abnormal cervical cytology in HIV positive women was greater than general population. Women infected with HIV who have low-grade squamous intraepithelial lesion (LSIL) are at risk of progression to high grade squamous intraepithelial lesion (HSIL) and invasive carcinoma. A cross sectional descriptive study was carried out among HIV infected women at ART clinic, Insein General Hospital. After taking informed consent, Pap smear was taken by disposable Ayre's wooden spatula and high vaginal swabs for bacterial culture. Ninety-four cases were collected in this study. Among them, NILM 60 cases (63.8%), NILM (Inflammatory) 16 cases (17.1%), ASCUS 11 cases (11.7%), LSIL 2 cases (2.2%), HSIL 2 cases (2.2%) were found. According to culture results, 40 cases (42.6%) were mono-infections in which *Bacillus species* 13 cases, *Micrococcus species* 10 cases, *Neiserriae gonorrhoeae* 2 cases, *Candida albicans* 2 cases, *Escherichia coli* 6 cases, Coagulase negative *Staphylococcus* 4 cases, *Citrobacter freundii* 1 case, *Citrobacter koseri* 1 case, and *Klebsiella pneumoniae* 1 case. The other 42 (44.6%) cases were associated with mixed infections of above organisms in which 15 cases of *candida albicans were associated with Neiserriae gonorrhoeae, Bacillus species, Citrobacter freundii and Ecoli.* Twelve cases (12.8%) revealed no pathogen isolated.

2. NON COMMUNICABLE DISEASES

2.1. CANCER

2.1.1. Screening of the cervical cytology in women attending Cervical Cancer Screening Clinic, DMR (2016)

Cervical cancer is one of the important public health problems and an estimated 528,000 new cases in 2012. According to Cancer Country Profile (WHO-2014), (12.7%) of cancer death in women is due to uterine cervix cancer which is second leading cause of female cancer mortality in Myanmar. Because of the phases that precede the lesion in the natural progress of invasive cervical cancer, and because they can be easily discovered and treated, the disease is well suited to screening programmes. This study aimed to determine the prevalence of abnormal cervical cytology and associated factors among women attending Cervical Cancer Screening Clinic, DMR.

In 2016, total 469 women were screened at the clinic. Among them, 11.6% of the women were found as abnormal cytology results. In which, 2% was CIN1, 1.3% was CIN 2 and 0.2% was CIN 3.

Table: Cervical cytology result from 2012 to 2016

Cytological Diagnosis / Year	**2012**		**2013**		**2014**		**2015**		**2016**		**Total**	
	n	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
Normal	**412**	**51.0**	**529**	**53.5**	**353**	**50.9**	**256**	**40.8**	**203**	**43.2**	**1753**	**48.9**
Inflammatory	**333**	**41.3**	**373**	**37.7**	**281**	**40.5**	**334**	**53.1**	**212**	**45.2**	**1533**	**42.7**
Abnormal	**62**	**7.7**	**87**	**8.8**	**60**	**8.6**	**38**	**6.1**	**54**	**11.6**	**301**	**8.4**
Atypical Squamous Cells ASC-US/ Atypical Glandular Cells AGC-US	38	4.7	35	3.5	33	4.8	24	3.8	38	8.1	169	4.7
Mild Dyskaryosis / Koilocytosis (CIN 1)	13	1.6	10	1.0	18	2.5	12	1.9	9	2	62	1.7
Moderate Dyskaryosis (CIN 2)	7	0.9	41	4.2	4	0.6	1	0.2	6	1.3	59	1.7
Severe Dyskaryosis (CIN3)	0	0	1	0.1	2	0.3	1	0.2	1	0.2	4	0.1
Carcinoma in Situ / Squamous Cell Carcinoma	4	0.5	0	0	3	0.4	0	0	0	0	7	0.2
Total	**807**	**100**	**989**	**100**	**694**	**100**	**628**	**100**	**469**	**100**	**3587**	**100**

SERVICES PROVIDED

ACADEMIC

Sr.	Name	Course	Responsibility
1.	Dr. Aye Aye Lwin	MMedSc (Pathology) MMedSc (Microbiology) MMedSc (Pharmacology) MMed Tech(Medical Laboratory Technology) BMedTech (Medical Technology)	Teaching, Training and Demonstration
2.	Dr.Nan Cho Nwe Mon	MMedSc (Pathology) MMedSc (Microbiology) MMed Tech(Medical Laboratory Technology) BMedTech (Medical Technology)	Teaching, Training and Demonstration
3.	Daw Kyi May Htwe	MMed Tech(Medical Laboratory Technology) BMedTech (Medical Technology)	Demonstration
4.	Daw Khin Than Maw	MMed Tech(Medical Laboratory Technology) BMedTech (Medical Technology)	Demonstration

LABORATORY TESTS

Sr. No.	Laboratory tests	Tested Samples
1.	Blood Sugar	12
2.	Lipid profile	41
3.	Cholesterol	18
4.	Triglyceride	5
5.	Uric acid	54
6.	ALT(Alanine aminotransferase)	15
7.	AST (Aspartate aminotransferase)	15
8.	ASO (Anti-streptolysin O)	28
9.	RA (Rheumatoid arthritis)	17
10.	Urea	19
11.	Creatinine	24
12.	(a) LFT for project from Pharmacology Research Division	64
	(b) ALT, AST for project from Pathology Research Division	38
	(c) Lipid profile for project from Clinical Research Division	31
13.	Cervical Cancer Screening Clinic (Pap Smear)	492