BLOOD RESEARCH DIVISION

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Blood Research Division is primarily involved in research studies on red cell disorders, diagnosis as well as management of common haematological malignancies, haemostasis and coagulation disorders to identify and solve the health problems related to haematological diseases and disorders. The clinical arm is further supported by the Clinical Research Unit on Haematology at the Yangon Children's Hospital.

RESEARCH PROJECTS

1. NON-COMMUNICABLE DISEASES

1.1 CANCER

1.1.1 Knowledge and home management practices of caregivers related to childhood leukemia patients attending to Yangon Children Hospital

Leukemia is the commonest childhood malignancy worldwide as well as in Myanmar. The care of children with cancer is a complex and challenging and caregivers are part of the health care team. Caregivers are responsible for personal hygiene, healthy diet, psychological support, prevention of infection, awareness and management of side effect of drugs. Therefore this study aimed to assess the knowledge and practices on acute leukemia disease among caregivers of childhood leukemia patients. A cross sectional descriptive study was carried out at Haemato-Oncology follow-up clinic at Yangon Children Hospital. A total of 120 caregivers of childhood leukaemia patients were interviewed using structured questionnaire. Knowledge questionnaires sheet consisted of 15 questions related to caregiver's knowledge as disease definition, causes, sign and symptoms, etc. Highest score given was 23, mean knowledge score was 14.3 ± 2.4 (range 8 to 21). The practice question sheet consisted of 16 items related to caregiver's practice such as care of symptoms and side effect of chemotherapy, etc. and total scores were given 16 points with mean practice scores was 10.92 ± 2 (range 6-15). Most of the caregivers were aged between 25-44 years among them 95% were female (85% mothers). The majority (85%) had low and medium education level. Nearly all (97%) of caregivers knew that their child was suffering leukemia (blood cancer). Half of the respondents did not know what are the causes of leukemia and 38.3% mentioned genetic cause. The common knowledge about presentations of leukemia included anemia (60.8%) and prolonged fever (56.6%). Regarding knowledge about different treatment strategies to childhood leukemia, 78.3% of caregivers stated chemotherapy, 10% responded radiation therapy and only 3.3% know bone marrow transplantation. 18.3% of

caregivers knew wrongly that regular taking of antibiotics as cancer treatment. More than three fourth (75.8% to 85%) of respondents had knowledge on side effects such as alopecia, loss of appetite, nausea/vomiting, anxiety and depression. Moreover, all caregivers knew their children needed regular cancer treatment and follow-up at Haemato-Oncology Department, Yangon Children Hospital. Most of them (92.5%) obtained knowledge about childhood leukemia from health staff. Regarding the homecare practice of caregivers, nearly all of them had good practice on personal hygiene of children such as hand washing (96.6%). 95% of caregiver avoided their children to contact with ill persons. Nearly one third (30.4%) of caregivers encouraged their child to feed small and frequent meals to manage nausea and vomiting. High percentage of leukemia children (81.6%) used soft brush to clean teeth and gum for prevention of mouth ulcer but only 43.3% of caregivers observed enough hydration to the child to prevent mucositis. Moreover 39.2% of caregivers did not practice to measure temperature with thermometer when they felt heat. Although caregivers of our leukemia children were having higher knowledge level, some homecare practices were still needed to improve in this study. Therefore, in order to get high score of the desirable practices, health professionals should more emphasize on these points when they give health education to caregivers about homecare management.

1.1.2 Relationship between coagulation parameters and disease severity in patients with primary lung cancer attending at Medical Oncology Unit, Yangon General Hospital

Activation of coagulation and fibrinolysis is frequently encountered among cancer patients. Such tumors are supposed to be associated with higher risk of invasion, metastasis and eventually worse outcome. This study was aimed to find out the relationship between coagulation parameters and diseases severity in primary lung cancer patients. A total of 103 primary lung cancer patients attending to Out Patient Department of Medical Oncology Unit, Yangon General Hospital, were involved in the study. The median age of 59 years (range from 13 to 82 years) with male to female ratio of 1.8:1. Among them, 81% of lung cancer patients had history of smoking. Regarding the primary site of the tumour, 64% (66) of cases were right sided lung cancer and 36% (37) had left sided tumours. Pretreatment blood coagulation test included fibrinogen level, prothrombin time, International normalized ratio (INR) and platelet count were determined by using automated blood coagulation analyzer CA -50 Sysmex. Chi square test and t-test were used to find out the relationship between histological types, staging of lung cancer and coagulation parameters. Statistical analysis was carried out using SPSS 22 software. A p-value of <0.05 was regarded as statistically significant. According to revised WHO classification of the lung tumours, 7(6.8%) of the tumours were small cell lung cancer, 51(49.5%) squamous cell carcinoma, 35(34%) adenocarcinoma, 10 (9.7%) other types (large cell carcinoma and anaplastic carcinoma). According to TNM staging, 4 cases (3.9%) were stage I, 14 (13.6%) stage II, 35 (34%) stage III and 50 (48.5%) were stage IV. The plasma level of all coagulation tests revealed significant in correlation to advanced (stage III and IV) stage of lung cancer and plasma fibrinogen level ($p < 0.0001$), prothrombin time ($p = 0.007$), INR ($p=0.002$) and platelet count ($p = 0.009$), respectively. However, histological types of lung cancer were not significantly associated with coagulation parameters. Therefore, this study pointed out that the high levels of coagulation parameters were associated with advanced cancer staging and these parameters might be used as the predictors for disease severity of primary lung cancer patients. Regular monitoring of these parameters is essential for clinical management of cancer patients.

1.1.3 Immunohistochemical expression of Epidermal Growth Factor Receptor (EGFR) in malignant surface epithelial tumors of ovary

Ovarian cancer is most challenging and the deadliest gynaecologic cancer. Epidermal Growth Factor Receptor (EGFR) is one of the tyrosine kinase receptor and acts as proliferation and angiogenesis. The identification of EGFR has led to the development of anticancer therapeutics directed against EGFR (Targeted therapy) and plays an important role in prognosis and survival in ovarian cancer. The aim of this study is to find out the distribution of the immunoreactivity of EGFR in different histologic types and grades of malignant surface epithelial tumours of ovary. During August 2015 to September 2016, total 54 cases of malignant surface epithelial tumours of ovary from North Okkalapa General Hospital and Thingangyun Sanpya General Hospital were included. The median age was 55 years (range: 15-93 years). The commonest histological type was serous cystadenocarcinoma (30,56%), mucinous cystadenocarcinoma (18,33%), clear cell carcinoma (5,9%) and malignant Brenner tumor (1,2%). Among the samples, eleven cases were well differentiated (20.3%), 33 were moderately differentiated (61.1%) and 10 were poorly differentiated ovarian cancer (18.6%). The positive EGFR immunoreactivity shows complete or incomplete circumferential brown membrane staining of tumour cells. Less than 5% of positive Immunostaining was regarded as negative, 5-25% (+) positivity, 26-50% (++) positivity, 51-75% (+++) positivity and 76-100% (++++) positivity. Out of total 54 samples, EGFR was negative in 43% and 39%, 11%, 7% were positive (+), (++) and (+++), respectively. It was observed that the higher the histological grading, the more expression of EGFR in this study. Therefore this study demonstrated that EGFR expression could predict the prognosis of malignant surface epithelial tumours of ovary and could help in further management.

Table: Distribution of EGFR immunoexpression on different histological grades of malignant surface epithelial tumours of ovary

Tumor grade	EGFR immunoreactivity Number (%)			
	Negative	Positive (+)	Positive (++)	Positive (+++)
Well differentiated	8(73%)	2(18%)	1(9%)	0
Moderately differentiated	13(39.1%)	15(45.4%)	3(9.1%)	2(6.9%)
Poorly differentiated	2(20%)	4(40%)	2(20%)	2(20%)

1.2 HAEMATOLOGICAL DISORDER

1.2.1 Comparison of the accuracy of haemoglobin measurement using non-invasive haemoglobin device and automated Haematology analyzer

Non-invasive haemoglobin device is based on pulse oximetry method and takes less than one minute to get the haemoglobin level so it is useful in mass screening for detection of anaemia. However, evaluation of the accuracy of this non-invasive haemoglobin device is crucial for practical application. The study was a collaboration study with Department of Medical Research and World Vision. This study aims to compare the accuracy of haemoglobin measurement using non-invasive haemoglobin device and automated Haematology analyzer. A cross sectional study was conducted in Hlaing Tharyar Township where World Vision has a Maternal and Child Health project. A total of 371 apparently normal persons: pregnant women, women of reproductive age (18-49 yrs) and 1 to 5 years old children were involved in this study. Haemoglobin level was measured using non-invasive Haemoglobin device; SMART-Hb by Tech4life Enterprises and haematology analyzer (Sysmex KX-21). SMART-Hb device determines haemoglobin levels by using the

principle of near-infrared spectroscopy in combination with analysis of optical images taken by a charge-coupled device camera located at the opposite side of light sources. The haematology analyzer was considered as the reference method and the non-invasive haemoglobin device was a method of comparison. Before taking a blood sample for assessment of Hb level, non-invasive haemoglobin device probe was placed on participant's right index finger for 20 minutes and take off the probe. Another two consecutive haemoglobin measurement was done by the device. A paired t-test was performed to compare the Hb level between two methods. The mean Hb level obtained through non-invasive haemoglobin monitor and automated Haematology analyzer were 11.87g/dL and 12.46g/dL, respectively for women with reproductive age. The mean difference of the two Hb values was -0.59 (SD =1.5693, n=116). Similarly, for 1 to 5 years old children, the mean Hb level obtained through non-invasive haemoglobin monitor and automated Haematology analyzer were 10.96g/dL and 11.12g/dL, respectively. The mean difference of the two Hb values was -0.15 (SD =1.4416, n=137). For pregnant women, the mean Hb level obtained through non-invasive haemoglobin monitor and automated Haematology analyzer were 10.42g/dL and 11.60g/dL, respectively. The mean difference of the two Hb values was -1.19 (SD =1.2100, n=118). When all three study populations were combined, the mean Hb level obtained through non-invasive haemoglobin monitor and automated Haematology analyzer were 11.07g/dL and 11.69g/dL, respectively. The mean difference of the two Hb values was -0.62 (SD =1.4751, n= 371), t=-8.09, two-tail p = 0.000, providing evidence that the non-invasive Hb meter is not accurate as automatic Hb analyzer. A 95% C.I of mean Hb value is (-0.77, 0.47). Therefore, the technology applying in this non-invasive haemoglobin device needs to be updated to have better precision, user friendliness and further larger samples are required.

SERVICES PROVIDED

ACADEMIC

Sr.	Name	Course	Responsibility
1.	Dr. Win Pa Pa Naing	MMedSc (Pathology) MMed Tech(Medical Laboratory Technology) BMedTech (Medical Technology)	Teaching
2.	Dr. Khin La Pyae Tun	MMedSc (Pathology) MMed Tech(Medical Laboratory Technology) BMedTech (Medical Technology)	Teaching and Demonstration
3.	Daw Aye Mya Khine	MMed Tech(Medical Laboratory Technology) BMedTech (Medical Technology)	Demonstration

LABORATORY TESTS

Paraprotein testing of (90) serum samples by serum protein electrophoresis.