

**ORAL AND POSTER ABSTRACTS:
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**A CONTROL STUDY TO INCREASE THE EARLY DETECTION OF
TUBERCULOSIS DISEASE BY HEALTH EDUCATION
INTERVENTION AMONG MUKIM BANGKALALAK
AND MUKIM GADONG, BEAUFORT, SABAH**

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OBJECTIVE: This project paper is an intervention control study to increase early detection of TB disease on all the households in three villages in mukim Bangkalalak and three villages in mukim Gadong. **MATERIALS AND METHODS:** The study focused on three aspects of human behavior with regards to early detection of TB such as knowledge level, attitude level and practice level. To achieve this behavioral objective, three major strategies have been used for this study. Training strategy has been given to the health staffs and respondent through talks and exhibitions, communication strategy by giving talks, individual advices and mass media. The last strategy was through the organizational strategy implemented by the involvement of the villages' community and NGO like SABATA and SANA. **RESULT:** There were 237 respondents involved in this study, 137 respondents for case group and 100 respondents for control group. Comparison before and after intervention shows significant change in the knowledge level on TB disease. The number of respondents with positive attitude and practice also increased after the intervention has been carried out. As a whole, after the intervention study, it managed to increase the level of knowledge and awareness of the community for early detection; 48% of the adults have done TB screening during the intervention. **CONCLUSION:** This study also proposed the same activities to be done frequently in the community. It can be used to educate people to practice a healthy lifestyle.

CHARACTERISTICS OF HIV-INFECTED TUBERCULOSIS PATIENTS IN KOTA BHARU HOSPITAL, KELANTAN FROM 1998 TO 2001

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BACKGROUND: The incidence of HIV-associated TB has been increasing worldwide since the beginning of AIDS epidemic. Neither clinical features nor radiographic abnormalities can reliably distinguish majority of patients with HIV-infected TB. **OBJECTIVE:** Characterize the demographic profiles, clinical features, radiological patterns and outcome of treatment of HIV-infected TB patients. **MATERIALS AND METHODS:** A descriptive study on 149 HIV-infected TB cases diagnosed from 1998 through 2001 at Kota Bharu Hospital, Kelantan, Malaysia was carried out. **RESULT:** Majority of patients were males (94.6%), single (45.0%), Malay ethnic (94.0%) with mean age was 34 years (standard deviation 7.8, range 18–76). The most common HIV transmission category was through injecting drug use (73.8%), and being the inmates or former inhabitants of drug rehabilitation centers and prisons were the commonest high-risk groups. One hundred and seventeen patients were diagnosed as pulmonary TB, while about 20% were extra-pulmonary type with nine cases of military TB. Majority (45%) presented with cough symptoms, while only 51% had positive sputum smear. Fifty-five percent were found to have pulmonary lesions on the chest x-ray (CXR) such as localized or diffused pulmonary infiltrates, opacities or military. Eight (5.4%) had pleural lesions, while another eight cases had hilar or mediastinal lymph node lesions. Overall, 58 (38.9%) patients had died by the completion of data collection. The median weeks or survival from time of starting TB treatment were 13.5 (range 1–56) and majority of them (74%) died without completing the 6 months regime of treatment. **CONCLUSION:** TB with HIV co-infection commonly occurred in males, Malays and younger population; and presents with a typical clinical patterns and chest lesions. Standard antituberculous regimes may cure most of the patients by majority died without completing TB treatment.

JUSTIFICATION ON INITIATING EARLY TREATMENT FOR TUBERCULOUS MENINGITIS BASED ON CLINICAL RISK: A CASE REPORT

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OBJECTIVE: To discuss justification on initiating early treatment based on clinical risk in a case of tuberculous meningitis. **CASE SUMMARY:** A 54 years old Indian man presented to the Chest Department with sudden onset of left sided weakness associated with difficulty in swallowing. He also had slurred speech, unsteady gait, headache and blurring of vision. He was diagnosed as stroke with left hemiparesis and 7th nerve palsy on admission. As his condition was progressively worsening, lumbar puncture was done and cerebro spinal fluid (CSF) analysis showed increased protein (3.02g/l), decreased glucose (1.7 mmol/l) and predominant lymphocytes. However, CSF acid fast bacilli (AFB) direct smear and CSF AFB BACTEC were negative. Owing to the patient's risk factor as ex-IVDU and having a brother with pulmonary tuberculosis who had completed treatment, he was diagnosed as most probable tuberculous meningitis. He was then treated empirically with the EHRZ regimen (ethambutol, isoniazid, rifampin and pyrazinamide) and dexamethasone. However, his condition continued to deteriorate with fluctuating consciousness and persistent hyponatremia. **DISCUSSION:** Only a minority of cases of tuberculous meningitis has a positive microscopy for AFB. Smears and cultures may take several weeks to give a positive result. If the clinical picture and CSF features are consistent with tuberculous meningitis without other causes found, then treatment is indicated to prevent consequences of severe disease complication. The patient also had predisposing factors which will increase the risk factor of tuberculous meningitis. Furthermore, some of the antituberculosis drugs penetrates poorly to the central nervous system (CNS) and requires longer period to achieve therapeutic concentration. **CONCLUSION:** Thus, based on above mentioned problems, it is justified to initiate early treatment in high clinical risk patient after considering the risk and benefit.

SUDDEN ONSET OF ANTI-TUBERCULOSIS DRUG-INDUCED HEPATOTOXICITY IN A CRITICALLY ILL PATIENT

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OBJECTIVES: To report a case of rapid hepatotoxicity induced by antituberculosis (anti-TB) drugs in an ICU patient and to recommend an alternative regimen of non-hepatotoxic agents. **INTRODUCTION:** Anti tuberculosis drugs particularly rifampicin, isoniazid and pyrazinamide are often associated with hepatotoxicity. Time interval for onset of hepatotoxicity varied accordingly, ranging from 12 to 60 days (median 28 days). **CASE SUMMARY:** A 46 years old Malay male was admitted to the ICU following a surgical repair of perforated ileum secondary to pulmonary tuberculosis (PTB). He was started on an anti-TB regimen which consists of isoniazid (INH), rifampicin (RIF), pyrazinamide (PZA) and ethambutol (EMB). Liver function test (LFT) was normal upon admission. On day-5 of ICU stay, LFT revealed a marked elevation of total bilirubin, alanine transaminase (ALT) and alkaline phosphate (ALP). Subsequent test on the following day showed an increased in trend of the liver enzymes. Anti-TB medications were then withdrawn on day-10 and liver enzymes returned to almost normal on the same day except for bilirubin level which was still high. **DISCUSSION:** According to Naranjo's causal relationship algorithm, the likelihood that the incident of TB drugs-induced hepatotoxicity can be classified as possible. There have been a few reported cases of hepatotoxicity associated with TB-drugs which usually occurred after a few weeks. Sudden onset of hepatotoxicity could be contributed by multiple predisposing factors such as underlying liver disease, low albumin, malnourished and critically ill, which were present in this patient. **CONCLUSION:** Based on literature, it is recommended to give an alternative regimen on streptomycin (STM), ofloxacin (OFX) and EMB if the liver enzymes increased five times above normal. The alternative regimen is effective to control the disease and cause less hepatotoxicity.

IS COMPUTED TOMOGRAPHY (CT) SCAN A RATIONAL INDICATOR TO INITIATE TUBERCULOSIS THERAPY IN PATIENT WITH TUBERCULOUS PERITONITIS? A CASE REPORT

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OBJECTIVE: To discuss a case of initiating TB therapy in tuberculous peritonitis patient based on CT scan findings. **CASE SUMMARY:** A 15 years old Malay female was admitted to the Chest Ward with complains of abdominal pain and continuous fever for the past two weeks. She was started on empirical treatment of IV Cefuroxime and IV Metronidazole, and later switched to IV Sulperazon. Her urine and blood culture were not suggestive of any infection. Two days later, CT scan showed thickening of mesenteric nodes and was suspected of tuberculous peritonitis (TBP). She was started with antituberculosis EHRZ (Tab. Ethambutol, Tab. Isoniazid, Cap. Rifampicin and Tab. Pyrazinamide). Minilaparotomy with biopsy for mesentery was done later and the histopathology findings (thickened nodular parietal peritoneum with extensive modularity on the parietal and visceral peritoneum interloop adhesion) were consistent with TBP. The patient's prognosis improved with the TB treatment and she was discharged few days later. **DISCUSSION:** Generally, TB infection is identified and diagnosed based on acid fast bacilli smear, culture and mantoux test. But the above mentioned methods are not reliable to identify and diagnose TBP. TBP is slightly more prevalent in women especially young women. TBP is often insidious and may be non-specific, and should be considered in patients who originate from or have traveled recently to countries where TB is endemic, and who present with non-specific adnominal complaints, fever and weight loss over a long period. TBP is highly suspected in this patient due to presentation of some predisposing factors and also strongly supported by CT scan findings. Furthermore, the patient's bacteria culture was negative and she was not responding to the antibiotics given. CT scan findings were the major indicator used to initiate TB treatment. Later, decision in initiating early TB therapy was strongly supported by positive

results of histopathology findings. **CONCLUSION:** CT scan can be a rational indicator to initiate TB therapy in this patient. Furthermore, CT scan gives fast results, reliable and non-invasive.

PREPARATION OF RIFAMPICIN DRY POWDER INHALERS USING SPRAYING INTO ANTISOLVENT

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BACKGROUND: Rifampicin is a potent antituberculosis drug for treatment of pulmonary tuberculosis. The drug is high toxicity to nephron and sensitive to moisture sorption, resulting in degradation and loss activity. Rifampicin was formulated as dry powder inhalers using spraying into antisolvent in order to encapsulate drug, and the obtained microparticle was used to formulate dry powder for targeting to destroy *Mycobacterium tuberculosis*. **OBJECTIVE:** To study and develop rifampicin as dry powder inhaler in order to deliver to the lower airways *in vitro*. **MATERIALS AND METHODS:** Cholesterol from lanolin, L- α -Phosphatidylcholine from soy bean, and rifampicin were dissolved in chloroform. This solution formulation is forced through the nozzle into antisolvent which will transfer into lipid microparticle containing drug formed in the antisolvent. Solution of carrier (trehalose or mannose) was mixed with suspended formulation and was dried by lyophilization. These formulations give optimum encapsulation and physical properties for deposition throughout the lower airways *in vitro*. All of formulations were evaluated for the content uniformity, fine particle fraction (FPF) which particle size less than 6.4 μm that obtained by twin stage impinger, and mass median aerodynamic diameter (MMAD) that obtained by Andersen cascade impactor. **RESULT:** The ratio of cholesterol from lanolin and L- α -Phosphatidylcholine from soy bean of 1:3 by weight have the highest encapsulation of rifampicin ($95.36 \pm 0.12\%$), and rifampicin can be loaded in these formulations at approximately 50 mg. Only the trehalose formulations showed the physical properties suitable for dry powder inhalers. The FPF of formulation was $68.55 \pm 3.92\%$ with MMAD of $4.53 \pm 2.27 \mu\text{m}$, and content uniformity was $97.65 \pm 2.33\%$. **CONCLUSION:** Rifampicin can be encapsulated by spraying into antisolvent method and formulated dry powder inhalers with trehalose as carrier. The formulations have a size suitable for lung delivery after evaluation *in vitro*.

PREPARATION OF ANTITUBERCULOSIS DRY POWDER INHALERS USING PHYSICAL MIXING AND SPRAY DRYING

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BACKGROUND: Tuberculosis is the most significant infection causing human diseases. The current treatment of pulmonary tuberculosis involved prolonged oral administration of high dose of combined antibiotics, which is associated with unwanted side effects and poor compliances. Direct lung delivery of antituberculosis drugs may be able to solve these problems. **OBJECTIVES:** To study and develop antituberculosis drugs as dry powder inhaler in order to deliver to the lower airways in vitro. **MATERIALS AND METHODS:** Rifampicin and isoniazid as micronized particles were used to formulate dry powder inhalers by physical mixing with various ratios of fine and micronized trehalose, mannose or lactose as carriers. Isoniazid was prepared by spray drying technique using trehalose and lactose as carriers. All of the formulations were evaluated for the content uniformity of dosage, fine particle fraction (FPF) which particle size less than $6.4 \mu\text{m}$ that obtained by twin stage impinger, and mass median aerodynamic diameter (MMAD) that obtained by Andersen cascade impactor. **RESULT:** All of physical mixing and spray drying formulations have high content uniformity ($99.56 \pm 2.49\%$). FPF and MMAD of selected formulations are as follow:

| Method | Drug | Carrier | FPF (%) | MMAD(μm) |
|-----------------|------------|-------------------------|------------------|-----------------------|
| Physical mixing | rifampicin | 100% fine lactose | 79.04 ± 1.77 | 5.07 ± 0.88 |
| | | 100% fine trehalose | 75.42 ± 3.17 | 5.82 ± 0.64 |
| | | 100% micronised mannose | 72.91 ± 4.89 | 5.89 ± 0.71 |
| | isoniazid | 100% fine lactose | 81.51 ± 4.66 | 5.08 ± 0.67 |
| | | 100% micronised mannose | 73.86 ± 8.62 | 3.51 ± 0.66 |
| | | 100% fine trehalose | 64.74 ± 2.26 | 5.59 ± 1.02 |
| Spray drying | isoniazid | lactose | 71.11 ± 0.78 | 4.79 ± 1.31 |
| | | trehalose | 67.53 ± 2.63 | 6.49 ± 0.35 |

CONCLUSION: These formulations indicate that suitable particle size for lung delivery of antituberculosis drugs were obtained.

PREPARATION OF RIFAMPICIN ENCAPSULATED LIPOSOME DRY POWDER INHALERS

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BACKGROUND: Rifampicin is the first choice of drug in the treatment of tuberculosis but requires a high-dose drug treatment over a period of 4–6 months. Rifampicin also has various side effects at dose levels administered in a long-term clinical therapeutics, such as hepatotoxicity. In addition, poor penetration of antituberculosis drug into the cell resulting in decrease activity intracellularly is the major reason for the limited activity of most antituberculosis. Loading antituberculosis into liposome which is phospholipid bilayer vesicle, and then directly deliver to alveoli in dry powder form by inhalation is expected to maximize the therapeutic indices, and minimize the associated side and toxic effects. **OBJECTIVES:** To investigate the effect of liposome ingredients on their physicochemical characteristics. To prepare rifampicin encapsulated liposomes in dry powder form. **MATERIALS AND METHODS:** Soy bean phosphatidylcholine (SPC) and cholesterol (CH) were the main ingredients used in liposome preparation by dry film method. Negatively charge substances [eg., dicetyl phosphate (DCP) or phosphatidylinositol (PI)] were added in order to enhance liposome stability, percent encapsulation. The desired liposome suspension was then transformed into dry powder form by freeze dried which various sugars were used as cryoprotectant. Preliminary in vitro evaluation of obtained dry powder inhaler is performed by Andersen cascade impactor. **RESULT:** Percentage of rifampicin encapsulated into liposomes was 30–37% when lower contents lipid was used and could increase to 50–60% in higher lipid contents formulations. The size of liposome vesicle was stable for at least two weeks, while the formulations with negatively charge or high contents of cholesterol could improve the stability. The freeze-dried liposome products are sticky and have high moisture contents (9–20%). However, lactose is a suitable carrier for this strategy. Mass Median Aerodynamic Diameter (MMAD) of lactose formulation is 8.16 μm and fine particle fraction (FPF) is 69.22%. **CONCLUSION:** The rifampicin liposomes obtained have high percent encapsulation and its size stability. High percent encapsulation can be increased by increasing lipid contents and

adding negative charge substance. The MMAD of 1–5 μm and low moisture content of dry powders required in order to increase fraction to alveoli.

SIGNIFICANCE OF SYMPTOMS AND INVESTIGATIONS IN TUBERCULOSIS CASE FINDING

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BACKGROUND: TB has been known since ancient times and came very near to being eradicated due to an effective strategy for combating the disease in developed countries. However, it is once again a serious public health problem due to the resurgence all over the world, especially the developing countries. The WHO target by 2005 is to detect at least 70% of all estimated sputum positive cases and to treat successfully at least 85% of them. The treatment is almost achieved by most developing countries using the DOTS strategy, but the case finding is lacking behind due to several factors. The most important way to diagnose TB is by history of chronic respiratory symptoms, later followed by sputum microscopy and chest radiography. Respiratory symptoms play a vital role in early suspicion and detection of TB. **OBJECTIVE:** To analyze the correlation of symptoms and investigation in the diagnosis of tuberculosis. **MATERIALS AND METHODS:** A retrospective study was done in Respiratory Clinic, Penang Hospital from January to December 2003. All pulmonary TB diagnosed during the period of study was included. Data was obtained from the TB Information System folder, TBIS 10B-1. Extrapulmonary tuberculosis and cases with inadequate data were excluded. **RESULT:** A total of 237 cases were reviewed during the study period. A third of the patients (35%) were in the productive age group and 46% of patients were more than 50 years of age. Among the four main symptoms of cough, fever, loss of appetite and weight, and haemoptysis, cough is the most common symptom (92%); only 8% had all four symptoms. Smoking was noted in 57% of cases and 30% were diabetic. Seventy three percent had moderate to severe changes in the chest radiography. Only 17% had sputum negative for AFB, 44% had weakly positive sputum for AFB and 25% had heavily positive sputum for AFB. **CONCLUSION:** There was no strong correlation between the symptoms, CXR and sputum microscopy. The severity of CXR and sputum microscopy has some correlation. It is thus important that any patients presenting with chronic cough, sputum microscopy and CXR are done routinely to exclude TB. In this study,

diabetes is a strong risk factor for TB (30%), and any diabetic patients with chronic cough should be investigated for TB.

CHARACTERISTICS OF PULMONARY TUBERCULOSIS IN HIV SEROPOSITIVE PATIENTS IN CHEST CLINIC, PENANG HOSPITAL

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BACKGROUND: The human acquired immunodeficiency virus (HIV) is one of the main factors contributing to the resurgence of the disease. HIV infection amplifies and accelerates the development of TB from infection to the advanced stage of the disease. HIV also is the most important risk factor to be associated with the reactivation of a prior TB infection. **OBJECTIVES:** (i) To analyse the demographic profiles and bacteriological features of TB among HIV seropositive patients TB. (ii) To determine the radiological findings and bacteriological profiles of TB among HIV seropositive patients. **MATERIALS AND METHODS:** (i) Retrospective and descriptive study conducted in the Chest Clinic, Penang Hospital during the study period from January 1, 2001 to December 31, 2002. (ii) The study subjects have to fulfill the following criteria: (a) HIV seropositive as determined by enzyme linked immunosorbent assay (ELISA). (b) All patients who were diagnosed as TB by CXR, sputum smears positive, sputum culture positive, pleural fluid and fine needle aspiration cytology (FNAC) of lymph nodes which are positive from patients data sheet. **RESULT:** (1) There was no correlation between mantoux test and sputum culture and CXR severity. (2) Higher frequency of male individuals of Chinese ethnicity in the age group of 35–45 years. (3) HIV seropositive patients present with higher incidence of sputum smear negative, sputum culture positive and non reactive tuberculin skin test. (4) Pulmonary TB comprises 63%, extra-pulmonary TB 22%, and PTB and extra-pulmonary TB 15%. TB adenitis was the most common type of the extra-pulmonary TB. (5) CXR findings were found to be moderate to severe in sputum negative patients. **CONCLUSION:** Screening for TB infection should be effectively implemented among HIV patients to reduce the incidence of TB in the near future as the presentation can be a typical.

HIV/TB CO-INFECTION IN PRISONS AND DRUG REHABILITATION CENTRES IN SELANGOR STATE, MALAYSIA, 2000–2003

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BACKGROUND: TB remains a public health challenge in Malaysia with around 14,000–15,000 new cases reported annually. From 1996–2001, the number of HIV/ TB co-infection reported nationwide had increased from 329 to 746 cases. In Selangor, HIV/ TB co-infection was first reported in 1998 and this has ranged from 80–140 cases notified annually for the period of 2000–2003. Most of these cases were reported from prisons and drug rehabilitation centers (DRC) in the state, and the main identified risk factor was intravenous drug abuse. **METHODOLOGY:** This was a descriptive study on the surveillance data obtained from the HIV/ TB screening programme implemented in the two prisons and three DRC in Selangor state for the period of 2000–2003. **RESULT:** During the period of 2000–2003, TB screening was done on 48% of the 6,435 HIV inmates detected in these institutions. Of those HIV inmates screened, the average HIV/TB co-infection rate was 11% with a range of 7–15%. **DISCUSSION:** Prisons/DRC face a serious challenge in meeting the public health problems of HIV/ TB co-infection in their institutions. This situation is further complicated as these institutions do not have their own health system and currently depend on the resources of the Health Ministry to run the HIV/TB surveillance programme. The recommendations were measures to ensure TB screening of all HIV inmates identified and to ensure treatment completion for inmates released from these institutions while on TB chemotherapy. Long-term measures identified were the establishment of an indigenous health care system in these institutions to meet the health needs of their inmates. The feasibility of anti-TB chemoprophylaxis for high-risk HIV patients and free access to highly active anti-retroviral therapy (HAART) for HIV inmates need to be explored.

DEFICIENCIES IN CASE FINDING OF TUBERCULOSIS

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BACKGROUND: In 2003, the incidence rate of TB in Sarawak was 79.9/100,000. The control of TB could have impeded by case finding deficiencies. **AIM:** To determine patients and health care providers factors in delaying TB detection. **MATERIALS AND METHODS:** Respondents were newly diagnosed active pulmonary TB patients and their attending health care providers before diagnosis. Structured questionnaire was used to interview these purposive samples in a cross-sectional survey. Out-patient recording formed another data source. Data collection commenced from June 2003 until the sample size was attained. **RESULT:** 55 patients and 16 medical assistants were recruited. Most patient respondents were male (63.3%), Iban (76.4%), poor (91%) and farmers (58%). 61.9% had delayed diagnosis (at least 60 days from symptom onset to diagnosis) and 20% was secondary case-patient. The median interval for first patients-health care providers contact was 38.5 days (delayed diagnosis) and 28 days (non-delayed). The median interval for diagnosis was 62 days (delayed diagnosis) and nil (non-delayed). Symptoms appeared to decide patients timing for seeking treatment. Health care providers delayed in diagnosis included: (1) no radiographic and bacteriological investigation during first visit; (2) no follow-up of patients with normal findings; (3) no continuity of care for follow-up patients; and (4) no detailed history. Obvious presenting symptom was the main reason for non-delayed in diagnosis. Findings also showed most medical assistants did not translate theory into practice. **DISCUSSION:** Delay diagnosing TB would increase the pool of infections which in turn increase the incidence of disease. This study showed both patients and health providers role in delaying diagnosis. Disentangling patients reasons for delay in seeking treatment is difficult but an attempt to do so is important, thus, similar studies would be useful to provide answers. **CONCLUSION:** This study indicates that efforts are necessary to shorten health care providers delay in diagnosing TB.

TUBERCULOSIS DEVELOPMENT IN A PATIENT WITH CHRONIC HISTORY OF STEROID ABUSE: A CASE REPORT

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OBJECTIVE: To discuss a case of a patient who developed TB after using steroid for more than 10 years. **CASE SUMMARY:** A 60 years old Chinese male was referred from Seberang Jaya Hospital for septic shock management. He had developed Cushing's syndrome due to extensive steroid therapy. He had a history of chronic abuse of steroid (topical, oral and injection) for his skin problem. He stopped steroid six months ago when he developed lower limbs weakness. Patient also had cough for about six months. He had been managed in General Intensive Care Unit (GICU), Penang Hospital for septic shock, acute renal failure, ischemic heart disease, multiple skin problems, coagulopathy and hypoalbuminemia. Patient was ventilated. On examination, air entry into lungs was found to be reduced bilaterally and presence of crept at lower lobes of both lungs. CXR revealed patchy opacities over the right upper lobe. Tracheal aspiration was confirmed positive for AFB on September 3, 2004. On September 4, 2004, patient was started on TB therapy. **DISCUSSION:** Extensive corticosteroid therapy can compromise the immune system and predispose to development of active TB. As TB had made its come back in Malaysia, it is very important for medical professionals to justify the use of steroid and monitor patients who are on extensive corticosteroid therapy besides explaining this risk factor to the patients. Patients should be advised to avoid exposure to TB patients. Patients should be also advised on steroid usage and traditional medicines, which contain steroid. **CONCLUSION:** TB can develop in patients who are immunocompromised due to chronic steroid therapy. Medical professionals should avoid unnecessary steroid use in patients and educate patients on the risks of steroid.

EVALUATION OF THE TUBERCULOSIS MANAGEMENT AT DUNGUN HOSPITAL

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INTRODUCTION: The objective of this study is to evaluate the management of TB at Dungun Hospital in order to provide valuable information that can be used by the National TB Programme.

METHODOLOGY: This study was conducted prospectively among all adult (> 18 years) patients who were newly diagnosed as having PTB in Dungun Hospital from the year 2001 to 2003. Data were taken from patient's TB profile by using formatted form. The exclusion criteria are PTB patients younger than 18 years old, non PTB cases and relapse cases.

RESULT: This study involved 176 patients with majority of them were Malay (96.0%) and 2.8% Chinese with the percentage of male is higher than female, which was 72.7% versus 27.3%. 61.3% of the respondents were from rural area (> 10 km), which was 24.95% from Felda area. Most of the cases were in productive aged with the range of 20 to 60 years old (81.3%). Social history revealed 14.2% (n = 25) were HIV positive. Seventy cases (39.8%) were active smoker and 9 of them stopped after had been diagnosed with TB. 10.2 % of the respondents were diabetic patients, whereas 4.0 % were diabetic with cardiovascular disease. Forty six percent of the respondents had an advanced PTB and 38.1% were with moderate findings. The effectiveness of the vaccination are questionable because 64.2% of them having BCG scar. The most popular regime in treating PTB is 2SHRZ/4SHR² (49.4%) although it also had the highest percentage (54%) of changing to other regime. Other regime used is 2EHRZ/4RH² (34.1%). 10.8% (n = 19) was developed adverse drug reaction (ADR), where 11 are from 2SHRZ/4SHR² regime. The defaulter rate is 7.4% (13 cases) due to multifactorial factor either individual or drug resistance. There was no multi-drug resistance case within the study year. 72.2% had completed treatment, 2.8% (n = 5) of the patients was relapse and 28 cases (15.9%) died, comprised of 16 cases (57.1%) were HIV positive.

CONCLUSION: From the study, we manage to get preliminary data from the management of TB. Result showed that there are many factors that can affect the

management; late detection, less cooperation, health status, knowledge, attitude and belief are among the contributing factors. Therefore, monitoring of TB cases should be done in concert by all categories of health care workers, and awareness of the public also plays an important role.

*Note: S = Streptomycin, H = Isoniazide, R = Rifampicin, Z = Pyrazinamide, E = Ethambutol, 2SHRZ + 4SHR² = SHRZ daily dose x 2/12 and SHR biweekly dose x 4/12

QUALITY OF TUBERCULOSIS DRUGS AND PITFALLS IN THEIR MANAGEMENT SYSTEMS IN LOWER SOUTHERN THAILAND

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BACKGROUND: There are anecdotal reports that deteriorated TB drug were dispensed from Thai hospitals. This information needs verifications along with management evaluation. **OBJECTIVES:** To assess the quality of TB drugs used in TB treatment facilities in southern Thailand and to assess the TB drug management systems. **MATERIALS AND METHOD:** Cross-sectional study utilizing interview, document review, inspection of drug storage, visual examination of TB drugs, and laboratory analysis samples of isoniazid (INH), rifampicin (RMP), pyrazinamide (PZA) and ethambutol (EMB). Data were obtained from 3 institutes at national and regional levels and 49 hospitals. **RESULT:** No stock-out of TB drugs was found at any level. There were pitfalls in transportation, storage, inventory control and daily dose packing. At least one kind of deteriorated TB drug was encountered by the responsible officers in 44 (85%) hospitals/institutes within the past years, found in 28 (54%) of the inspected drug inventories, and reported by 44 (15%) of the TB patients. Forty four percent of hospitals/institutes had grossly deteriorated EMB on the day of inspection. All samples, except 14% of EMB, passed in content assay tests. All INH and EMB samples passes in dissolution tests, but 62% of RMP samples and 26% of PZA samples failed. **CONCLUSION:** Sub-standard TB drugs is a serious problem for TB control. TB drugs in the study area were not managed properly. Education on TB drug packaging and storage, good systems in TB drug distribution, storage, inventory control, quality assurance and supervision are essential interventions.

THE EPIDEMIOLOGICAL STATUS OF TB/HIV-AIDS CO-INFECTED INDIVIDUALS IN MALAYSIA

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BACKGROUND: The threat of TB seemed to have become increasingly imminent with the lethal symbiosis of TB and HIV-AIDS. This danger is further compounded with the fact that HIV-AIDS is the foremost cause of death from infectious disease in the world; seconded only by TB. Co-infection with HIV and TB is a phenomenon that is becoming rampant worldwide and Malaysia is no exception. However, there is no substantial data concerning the co-infection of both the diseases in the country. **OBJECTIVE:** This study's main aim is to obtain a baseline data pertaining to the epidemiology of TB/HIV-AIDS in Malaysia. **MATERIALS AND METHODS:** Records of 231 patients co-infected with TB/HIV-AIDS between the months of January 1999 and June 1999, and between the months January 2000 and December 2002 were obtained from the Institute of Respiratory Medicine and the Infectious Disease Clinic at Kuala Lumpur Hospital. Data obtained was analyzed with the statistical package SPSS for Windows release 11.5. **RESULT:** Results attained indicated that the majority of patients were males (222), intravenous drug users (IVDUs) (179), Malays (129) and aged between 31–40 years (114). A total of 63 patients were employed and 54 patients were unemployed. The rest comprised of prison inmates (36), drug rehabilitation centre inmates (6) and those whose occupation status remained undetermined (72). The presence of BCG scar (indicating that the vaccine had been administered) was found in 92 (39.8%) patients. Most of the patients (175) were treated for TB with 2 months of daily doses of ethambutol, isoniazid, rifampicin and pyrazinamide followed by 4 months of biweekly doses of rifampicin and isoniazid (2EHRZ, 4RH2). There were only 14 patients who underwent antiretroviral therapy (ARVT) for HIV infection at the Infectious Disease Clinic, Kuala Lumpur Hospital. **CONCLUSION:** The results of this study indicated that the prevalence of TB/HIV co-infection was high among IVDUs and Malay males who were in the economically productive age group. However, absolute conclusions cannot be drawn without further investigations into the geographical and social parameters that are relevant and unique to Malaysia.

SUSCEPTIBILITY OF *MYCOBACTERIUM TUBERCULOSIS* TO RIFAMPICIN LOADED POLY-(ETHYLENE OXIDE)-BLOCK-METHOXYDISTEAROYLPHOSPHATIDYLETHANOLAMINE

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BACKGROUND: Rifampicin is the first line drug recommended by World Health Organization (WHO) for the treatment of TB. However, relatively high doses of orally administered drug are often required to maintain therapeutic concentrations for longer periods, which leads to several side effects. Therefore, to overcome this problem, delivering rifampicin directly to the lungs using biodegradable polymer as drug carrier may improve therapeutic efficacy and reduce side effects of the drug. **OBJECTIVE:** The main purpose of this study is to compare the minimum inhibitory concentration (MIC) of rifampicin and rifampicin loaded poly-(ethylene oxide)-block-methoxydistearoylphosphatidylethanolamine 5000 (mPEG-DSPE 5000) nanoparticles on a drug-resistant strain of *Mycobacterium tuberculosis* (clinical isolate, JB74). **MATERIALS AND METHODS:** Rifampicin-loaded-mPEG-DSPE 5000 nanoparticles were prepared by solvent evaporation method. The nanoparticles were then freeze-dried and stored in the lyophilized form until used. Susceptibility of *Mycobacterium tuberculosis* to rifampicin, mPEG-DSPE 5000 copolymer and rifampicin-loaded-mPEG-DSPE 5000 nanoparticles was examined using the 1% proportional method. The MIC of all samples were obtained after two weeks incubation of the cultured plates. **RESULT:** It was found that the MIC of rifampicin (200µg/ml) was eight times higher than rifampicin-loaded-mPEG-DSPE 5000 nanoparticles (25µg/ml). No inhibition of growth was observed for the isolate using mPEG-DSPE 5000 copolymer alone. **CONCLUSION:** The rifampicin loaded-mPEG-DSPE 5000 nanoparticles have shown better antimycobacterial activity against drug-resistant *Mycobacterium tuberculosis* compared to rifampicin alone. This may indicate that the nanoparticles could be used to improve the efficacy of rifampicin in the treatment of TB.

THE ISONIAZID BINDING MODE IN MUTANT INHA: MOLECULAR MODELING APPROACH

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BACKGROUND: The problem of TB drug resistance and the continuing rise in the disease incidence has prompted the research on new drug developments as well as on increasing the understanding of the mechanism of drug resistance. Molecular modeling techniques have been used to understand the mechanism of interaction between a protein and a ligand, substrate or inhibitor, at the atomic level. **OBJECTIVE:** To understand the interactions of INH and the mechanism of resistance in *M. tuberculosis* towards INH at the atomic level. **MATERIALS AND METHODS:** The docking experiments were carried out, employing the Lamarckian genetic algorithm with the pseudo-Solis and Wets local search of the docking program AutoDock3.0 for isoniazid, its activated form, INA-NADH and NADH into the active site of wild type and mutant type InhA. **RESULT:** The results showed that INA-NADH has tremendously high binding affinity towards InhA with more hydrogen bonding, hydrophobic, van der Waals, electrostatic and π - π interactions with InhA. S94A mutation caused INA-NADH to deviate from its crystal structure probably due to the unfavorable contact between the hydrophobic Ala94 and the highly polar NADH moiety. However, the energetic differences revealed that S94A mutation is a low level resistance compared to the high level resistance due to mutation or absence of KatG enzyme. **CONCLUSION:** The simulation is able to address the resistance mechanism towards INH in InhA mutant strains of *M. tuberculosis*. The S94A substitution probably causes INH resistance through weak binding of INA-NADH with InhA. The results also suggest that designing of new anti-TB drug that is not subjected to KatG enzyme, or improving the INH structure similar to INA-NADH structure might be a viable approach to overcome INH resistant TB.

TUBERCULOSIS: ARE CARERS CONCERNED ABOUT INFECTION RISK?

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INTRODUCTION: Caring for patients with infectious diseases may expose carers to risks of infection. A study was undertaken to determine the perception of hospital staff as to the risk of contracting TB. **MATERIALS AND METHODS:** Survey through using self administered structured questionnaire. Setting: Tertiary Referral Centre. The attitudes of staff working in the pulmonary medicine versus surgical out-patients clinics and wards were compared. **RESULT:** Satisfactorily completed questionnaire were returned by 31 and 48 members of staff from pulmonary medicine and surgery, respectively. A higher proportion of staff in pulmonary medicine indicated that they had a high risk of infection from TB (77.4% versus 39.5%), almost always undertook precautions to reduce infection risks (80.6% versus 67.4%) and they were inadequately compensated for the risk of infection (93.9% versus 79.1%). Similar proportions indicated that (a) their job satisfaction was high (60.8% versus 58.2%), (b) they were concerned about infection risk (70% versus 76.7%), (c) they occasionally reduced contact with potentially infectious patients (29% versus 32.5%), (d) staff exposed to infection risk should be better compensated (93.5% versus 95.4%) and (e) medical and paramedical staff will choose other forms of employment if they had the opportunity (41.9% versus 49.2%). A smaller proportion of staff from pulmonary medicine indicated that they preferred a working environment with less risk (41.9% versus 76.7%). **DISCUSSION AND CONCLUSION:** Although a larger proportion of staff from pulmonary medicine as compared to surgery perceived that they were at a high risk of infection from TB, smaller proportion indicated the preference for a working environment with less risk or nonmedical type employment. This may illustrate their familiarity, their being comfortable with their working environment and also their familiarity with the natural history of the disease. The large proportion who indicated that staff exposed to increased infection risks should be better compensated perhaps illustrates an issue when should be addressed.

TUBERCULOSIS TREATMENT COMPLIANCE IN SELANGOR STATE MALAYSIA, 2003

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BACKGROUND: Selangor is the most populated state in Malaysia with a population of 4.3 million in 2003. From the year 2000 to 2003, the TB cases notified had increased from 1,226 to 1,745 cases. Majority of the cases were from districts in the Klang valley, namely Petaling, Gombak, Klang and Hulu Langat. **OBJECTIVE:** This study was done to review the TB treatment compliance rate in this state for the year 2003. **MATERIALS AND METHODS:** This was a descriptive study on the TB treatment surveillance data reported from both hospitals and the health clinics. Two sets of data were analyzed; which were the TB cases reported through the mandatory communicable disease notification system and the treatment surveillance reports of TB patients treated in government facilities in Selangor. **RESULT:** There were 1,744 TB cases (incidence rate: 39/ 100,000 population) notified in Selangor in 2003. From this, 327 cases (19%) were treated in the private health care sector. Of the patients treated at the government health centers in Selangor, 139 patients (8%) had defaulted treatment for more than 1 month of which 12 patients were subsequently retrieved for continued treatment. **CONCLUSION:** The abandonment rate among patients treated in the government health centers is of concern as this indicates continued community transmission with the added risk of the emergence of multi- drug resistant TB (MDRTB). The TB patient treatment compliance in the private sector is presently not monitored. The recommendations were improved case holding activities such as patient treatment counseling services and the establishment of a rapid retrieval system based on Direct Observed Therapy (DOT). This has to be linked with a comprehensive TB treatment surveillance system in the private health care sector.

IS PULMONARY TUBERCULOSIS CASE PROPERLY IDENTIFIED IN LAHAD DATU? A CLINICAL AUDIT IN 2003

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BACKGROUND: It was seen that more than 50% of the PTB cases where sputum negative to Zeil Nielsen technique of direct microscopy method. **OBJECTIVE:** To identify the causes of high portions of Sputum Negative PTB in Lahad Datu District. **MATERIALS AND METHODS:** Audit using case notes of all Sputum Negative PTB cases in 2003. The expert review was done by independent reviewers from Unit TB and Leprosy, JKN Sabah. **RESULT:** Clinical staff just depends on x ray, mantoux test and Erythrocyte Sedimentation rate (ESR) only. This is further compounded by the inexperience of the staff which makes spot diagnosis. **CONCLUSION:** (1) To improve the sputum collection which is supervised. (2) To induce sputum collection using nebulized hypertonic saline. (3) Sputum culture to be done before instituting the anti TB treatment. (4) Review of cases with the local physician. The result of the audit and the various implementation steps are the sputum negative PTB cases have reduced to 30% only compared to 2002 which was 58%.