



World Family Medicine Journal

incorporating the Middle East Journal of Family Medicine

ISSN 1448-4196

January 2011 - Volume 9, Issue 1

Chief Editor:

A. Abyad
MD, MPH, AGSF, AFCHSE
Email: aabyad@cyberia.net.lb

Assistant to the Editor

Ms Rima Khatib
Email: Rima@amc-lb.com

Reporter and Photographer

Dr Manzoor Butt,
Email: manzor60@yahoo.com

Ethics Editor and Publisher
Lesley Pocock
medi+WORLD International
11 Colston Avenue
Sherbrooke 3789
AUSTRALIA
Phone: +61 (3) 9005 9847
Fax: +61 (3) 9012 5857
Email:
lesleypocock@mediworld.com.au

Editorial enquiries:

aabyad@cyberia.net.lb

Advertising enquiries:

lesleypocock@mediworld.com.au

2 Editorial

Abdul Abyad

Original Contribution / Clinical Investigation

3 <-- Iraq/Greece -->

Serum Total α -L- fucose and related parameters in breast cancer as tumor marker

Lweza Belal ABBASS, Salar Adnan AHMED

9 <-- Nigeria -->

Can clinical breast examination demonstrate improved breast self-examination?

A. M. Ogunbode, A.A. Fatiregun, M.M.A Ladipo

Review Article

14 <-- Nepal -->

Medical personnel's knowledge and technical skills in using a metered dose inhaler

Shrestha Ashis

Medicine and Society

19 <-- Jordan -->

The use of CRP as an early predictor of sepsis in infants and children
E Kefah Alqa'qa', Aghadeer Alhadidi, Mahdi Farahi

International Health Affairs

22 <-- Iraq -->

Tuberculosis in Iraq: a Post-Invasion Survey of Knowledge, Attitude and Practice in the Anbar Governorate

Thamer Kadum Yousif, Ross I. Donaldson, Dr. Sevil Husseynova

Case Report

31 <--USA -->

Atrial Myxoma presenting as asymptomatic left atrial mass
Momah, Tobe; Sarath, Reddy; Vasantha Kondamudi

From the Editor



A. Abyad
(Chief Editor)

Email: aabyad@cyberia.net.lb

This is the first issue of the year and I hope that this year will bring success and happiness to all readers, contributors, and the production team. With this year we are starting offering hard copy issues for anybody interested in the current issue or previous issues, at cost. We look forward as well to bringing a variety of papers from all over the world. This particular issue spans three continents.

A paper from Lebanon looked at the use of Intravenous Clomipramine for Treatment-resistant Obsessive-Compulsive Disorder. The authors stressed that 30-40% of OCD patients do not respond to SSRI. Clomipramine IV was suggested to be effective for OCD by several uncontrolled trials, even in patients who are non-responsive to oral clomipramine. The authors selected 30 patients with DSM-IV diagnosis of OCD from a larger sample of OCD patients who had been evaluated at the out-patient clinic in the department of psychiatry at the AUB-MC. CMI was given at a dose 50-225 mg/d (titrated up to a max dose of 225 mg) for 5-7 days. One of the major drawbacks of the study was the small size and the design of open trial. An important clinical improvement was observed in 23 out of the total of 30 patients on discharge, and in 18 patients after 24 weeks. Therefore, CMI has an important role and elicits a faster response in treatment-resistant OCD patients.

A survey from Nepal looked at medical personnel's knowledge and technical skills in using MDI. Data was collected from five tertiary level hospitals in Kathmandu Valley. A standard questionnaire was used to assess knowledge and a check list was used to assess technical skills. A total of 127 medical personnel took part in the study. Average knowledge of medical

personnel was 42.8% and technique was 59.18%. The author concluded that medical personnel lack knowledge and technical skills using MDI devices without which they cannot effectively educate patients. All medical personnel should be specifically trained to upgrade their knowledge and technical skills.

A case report from New York presented a case of asymptomatic left atrial myxoma in an African American male which was incidentally discovered on pre-operative evaluation at an advanced age. The advanced age of presentation with no attendant symptoms and the post operative complications (including Dressler's syndrome and cardiac tamponade) make this case especially significant for primary care doctors who are involved in pre-operative evaluations.

A paper from Nigeria evaluated the effect of clinical breast examination demonstration on improving breast self-examination (BSE) techniques. The authors randomly assigned adult women to either a poster-teaching on BSE and a clinical breast examination (CBE) demonstration group (intervention) or a poster-teaching on BSE only group (control). Repeated measure analysis of variance (ANOVA) was used for analysis. A total of one hundred and forty women participated; 68 in the intervention group and 72 in the control group. The authors concluded that a combination of CBE demonstration and poster health education on BSE did not provide an additional advantage over health education alone on improving BSE technique hence health workers should offer education on BSE technique to all women.

A second paper on breast cancer from Greece attempted to evaluate the usefulness of serum total a-L-Fucose, Protein bound fucose, Protein bound hexoses, Total Protein and Total calcium in the clinical diagnosis of breast cancer. Fifty four breast cancer patients and 40 healthy females (controls) were enrolled for the study. The results showed that the levels of serum Total a-L-Fucose, Protein bound fucose, protein bound hexoses, Total Protein and Total calcium in breast cancer were significantly higher compared with the control group. This test may be useful as an additional follow up tool in those who develop recurrent breast cancer.

A community-based cluster study from Iraq aimed to explore tuberculosis (TB) attitudes, knowledge and practices in Anbar Governorate, Iraq, as well as to compare these attributes with a subset of the population with good TB knowledge. Completed surveys were obtained from 692 subjects. 10.6% of these met study criteria for having good knowledge of TB. They were more frequent health care seekers ($p < 0.001$), although also more likely to be dissatisfied with the availability of medicine and equipment at those health clinics ($p < 0.001$). Higher percentages in this Good-Knowledge subgroup felt that TB affected relationships with friends ($p < 0.001$), family ($p = 0.039$) and work performance ($p = 0.036$). Community members from a wide-range of socioeconomic and educational levels require information about TB.

A retrospective study from Jordan looked the role of CRP as an early predictor of sepsis in neonates and children who present with symptoms and signs of sepsis. The medical records of patients with positive blood cultures were reviewed and the results of blood cultures as well as the CRP readings upon admission were recorded. A total number of 150 medical records of patients were included. The highest reading of CRP in the medical records of these patients was 384mg/l in 6 patients (4%) and these patients were noticed to have their blood cultures mostly positive. The authors conclude that although blood culture remain the gold standard for diagnosing sepsis, measurement of CRP level at the time of presentation with symptoms and signs of sepsis can be an early predictor of sepsis.

While all efforts have been made to ensure the accuracy of the information in this journal, opinions expressed are those of the authors and do not necessarily reflect the views of The Publishers, Editor or the Editorial Board. The publishers, Editor and Editorial Board cannot be held responsible for errors or any consequences arising from the use of information contained in this journal; or the views and opinions expressed.

Publication of any advertisements does not constitute any endorsement by the Publishers and Editors of the product advertised.

The contents of this journal are copyright. Apart from any fair dealing for purposes of private study, research, criticism or review, as permitted under the Australian Copyright Act, no part of this program may be reproduced without the permission of the publisher.

Serum Total α -L- fucose and related parameters in breast cancer as tumor marker

Lweza Belal ABBASS
Salar Adnan AHMED

Lweza Belal ABBASS
Ph.D. in Clinical Biochemistry, Dept. of Clinical Biochemistry,
College of Medicine,
Hawler Medical University
Iraq

Salar Adnan AHMED
Biochemistry Laboratory
College of Science -School of Chemistry
Aristotle's University of Thessaloniki
Thessaloniki - Greece

Correspondence:

Salar Adnan AHMED
Biochemistry Laboratory
College of Science -School of Chemistry
Aristotle's University of Thessaloniki

Thessaloniki - Greece

Email: salarzrari@yahoo.com

Introduction

Cancer of the breast is the most common malignancy among females in the world. Statistics show that in the United States alone about 200,000 new cases are diagnosed every year and about 50,000 women die annually from the disease(1,2).

Generally, cancer is the term applied to a group of diseases in which cells are not responsive to the normal restraints on growth. A single cell that divides abnormally eventually forms a mass called a malignancy or cancer. Cancer cells can also metastasise, separating from the growing mass and traveling through the blood and lymph(3). They also differ from normal cells in several ways.

These characteristics may involve any or all of the following :

- Uncontrolled cellular reproduction where cells become independent of normal growth signaling
- Cells contain abnormal nucleus of the cells and cytoplasm
- Mitosis rate is generally increased (4)

Once a cell becomes a tumor cell, many biochemical changes often found in the cells and at the surface of malignant cells, like alteration of surface charge, loss of certain antigen, alteration of oligosaccharide chain of glycoprotein and glycolipid constituents, alteration of permeability, inappropriate manufacturing of growth factors and hormones, increased rate of aerobic and anaerobic glycolysis and increased terminal transferase activity, are seen.(5,6,7)

α -L-Fucose (6-deoxy-L-galactose) is a monosaccharide that is a common component of many N- and O-linked glycans and glycolipids produced by mammalian cells. Two structural features distinguish fucose from other six-carbon sugars present in mammals. These include the lack of a hydroxyl group on the carbon at

SUMMARY

Objective: Our aim was to α - L-Fucose is a methyl pentose sugar similar to galactose except for the loss of the alcohol group on carbon number 6. It is found in human blood serum bound to protein by a covalent bonding and it is part of a large group of compounds known as glycoproteins.

The aim of this study was to evaluate the usefulness of serum Total α -L-Fucose, Protein bound fucose, Protein bound hexoses, Total Protein and Total calcium in the clinical diagnosis of breast cancer.

The study of biochemical changes during malignant transformation is also referred to as a form of chemical biopsy because it

facilitates the diagnosis of disease through the chemical eye.

Fifty-four breast cancer patients and (40) healthy females (controls) were enrolled for the study. The results of the present study showed that the levels of serum Total α -L-Fucose, Protein bound fucose, protein bound hexoses, Total Protein and Total calcium in breast cancer were significantly higher compared with the control group.

This test may be useful as an additional follow up tool in those who develop recurrent breast cancer.

Key words : α -L-Fucose, Breast cancer, glycoprotein, protein bound fucose, protein bound hexoses.

the 6-position (C-6) and the L-configuration(8) - Figure (1). It is also found at the terminal or pre-terminal position of many cell surface oligosaccharides ligands that mediate cell reorganization and adhesion signaling pathways.(9) In mammals, fucose-containing glycans have important roles in blood transfusion reactions, selecting-mediated leukocyte-endothelial adhesion, host-microbe interactions, and numerous oncogenic events, including signaling events by the Notch receptor family. Fucose metabolism appears to be altered in various diseases. Several studies have concluded that Fucose metabolism is abnormal in several pathological processes like cystic fibrosis, diabetes, cancer and atherosclerosis. (8,10)

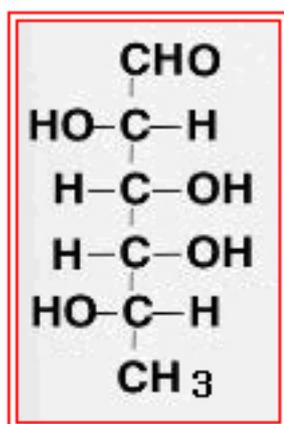


Figure 1: α -L-Fucose structure

Materials and Methods

1- Subjects:

This study consisted of patients with breast cancer and healthy controls. The control group had no evidence of any type of cancer or inflammatory disease. The breast cancer patients who registered in Rezgari hospital in order to receive treatment, underwent mastectomy and the diagnosis was validated histologically from the mastectomy specimen. The host information of the patients and normal subjects are summarized in Table 1 (next page).

This work was carried out in Erbil city; the collaborative study was between the Department of Clinical Biochemistry in the College of Medicine, Hawler Medical University and the Oncology Department in the Rezgari Teaching hospital, during the

period between February and July 2005.

2- Instruments and apparatus :

- Spectrophotometer (Spectronic 21)
- Centrifuge type Labofuge 200
- Water bath type Y14

3- Collection of Samples :

Blood sample were collected by venepuncture from breast cancer patients who were admitted to the Hawler Rezgari hospital (Breast cancer center) and also from the control group. The collected blood was allowed to stand at room temperature until it had clotted. The sample was centrifuged at 3000 rpm for 20 minutes for removal of any suspended cells. The separated serum was used for measurement of Total α -L-Fucose, Protein bound fucose, Protein bound hexoses, Total Protein and Total calcium.

A- Estimation of Total α -L- fucose :

The method of determination depends on a direct reaction of concentrated sulphuric acid with serum components. The reactants combine with Cysteine and the color product measured at (390-430 nm). The difference in wave length is directly proportional to alpha - L- Fucose content of the solution. This protocol of determination was adopted from the methods used by Dische and Shettels. (12)

B- Estimation of protein bound fucose (PBF):

PBF was determined according to Dische and Shettle method (12). A color product is formed by fucose in strong acid medium, which combines with color developer (cysteine hydrochloride), color product with cysteine measured at 396 nm and 430 nm. (12,13)

C- Estimation of protein bound hexoses (PBHex.):

The hexoses moiety of protein in carbohydrate conjugated is precipitated by 95% ethanol at room temperature and determined by the orcinol reaction (14).

D- Estimation of Total protein (TP):

Total protein is determined by biuret method according to B.L.Oser(15)

in which peptide bond of the protein reacted with cupric ion in alkaline medium to form complex color products.

E- Estimation of serum Total Calcium :

Colorimetric determination of calcium without deproteinization using O-cresolphthalein complexon interference due to Mg+2 ions is eliminated by 8- hydroxyl -quinoline up to 4mmol /L (16).

Statistical Analysis

Statistical analysis of this study was done using computer. Arithmetic mean and standard error (S.E) were calculated using statistical methods; student Z test was used to analyze the difference between sub groups concerning P value. Any value greater than 0.01 (P>0.01) was not regarded to be significant(11).

Results

Group I (Reference group) :

The mean \pm S.E for serum total α -L-Fucose level was (15.9 \pm 0.26mg/d) with a range of (13.2-18.9mg/dl). The mean level of serum protein bound fucose was (10.2 \pm 0.18 mg/dl) and the range of variation was (8.9-12.8) mg/dl. The mean values for protein bound hexoses was (124.8 \pm 1.34mg/dl) and the range of variation was (100-140) mg/dl and the means of total protein and total calcium were (6.59 \pm 0.07 gm/dl and 9.55 \pm 0.19 mg/dl) respectively. The range of variation was (5.9-7.8and7.1-11.8) mg/dl respectively, as shown in Table 2 (page 6).

Group II (Breast Cancer patients) :

The mean \pm S.E for serum Total α -L-fucose was (63.0 \pm 2.5mg/dl) with a range of (21-120mg/dl). The mean level of serum protein bound Fucose was (18.1 \pm 1.35mg/dl) with a range of (3.5-45) mg/dl. The mean values for serum protein bound hexoses was (134.48 \pm 2.6 mg/dl) with a range of (100-162mg/dl) and the mean level of serum total protein and total calcium was (7.6 \pm 0.08 gm/dl and 11.2 \pm 0.3 mg/dl) respectively, with a range of (6.8-9and 6.8-19) mg/dl respectively as shown in Table 2.

| Groups | Number of subjects | Age (years) | |
|-----------------------------|--------------------|-------------|-------|
| | | Mean | Range |
| Reference group | 40 | 46.8 | 22-67 |
| Patients with Breast cancer | 54 | 49.29 | 18-75 |

Table 1 : The host information of breast cancer patients and reference groups

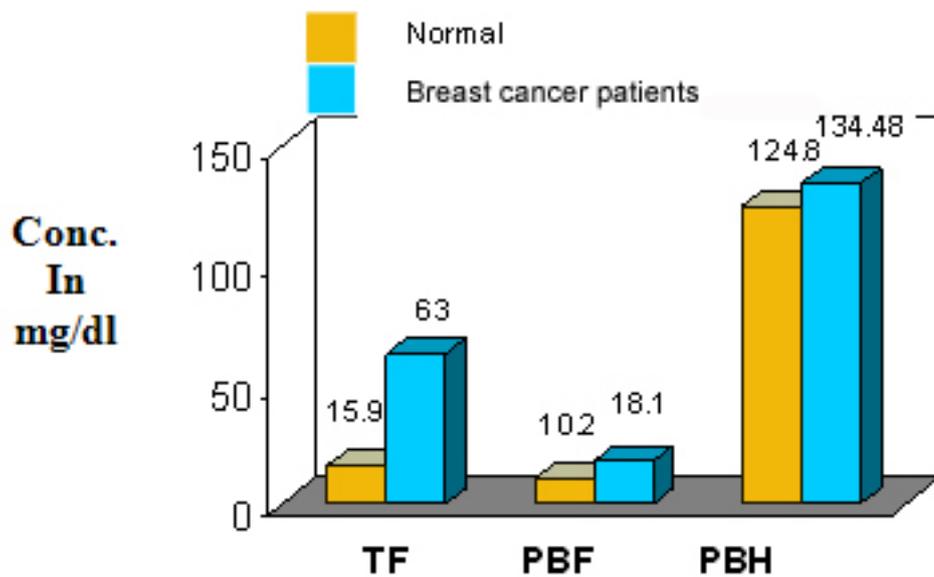


Figure 2: Comparison of serum total fucose ,protein bounded Fucose and protein bound hexoses in normal and breast cancer patients

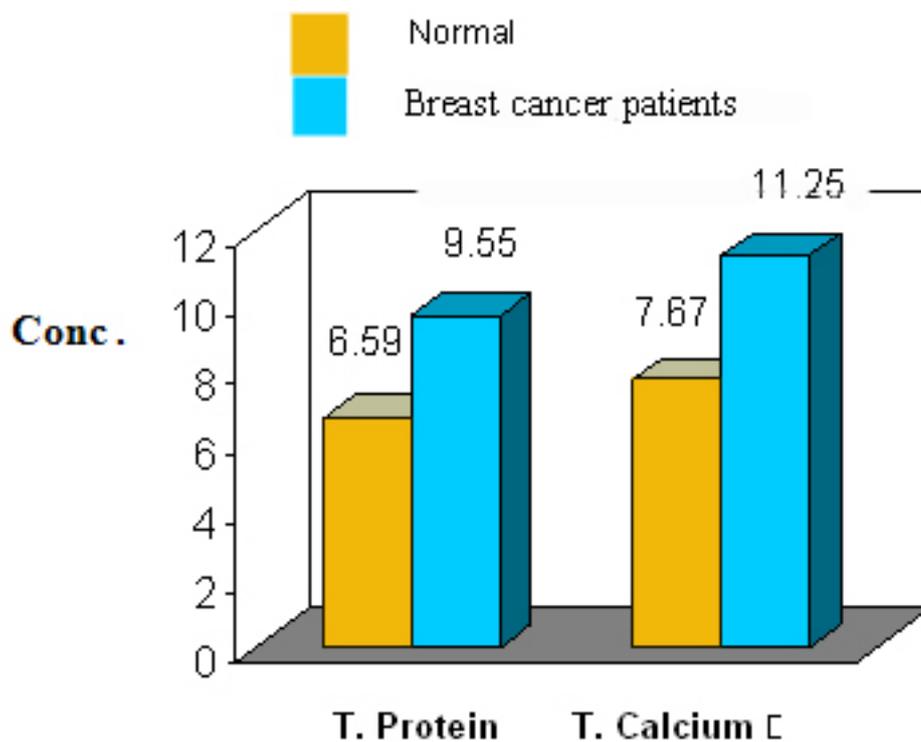


Figure 3: Comparison of serum total protein and total calcium in normal and breast cancer patients

| Substance assayed | Reference group | | Patients with breast cancer | |
|-----------------------------|-----------------|-----------|-----------------------------|---------|
| | Mean ±S.E | Range | Mean ±S.E | Range |
| Total fucose mg/dl | 15.9±0.26 | 13.2-18.9 | 63.0±2.5 | 21-100 |
| Protein bound fucose mg/dl | 10.2±0.18 | 8.9-12.8 | 18.1±1.35 | 3-30 |
| Protein bound hexoses mg/dl | 124.8±1.34 | 100-140 | 134.48±2.6 | 100-140 |
| Total protein gm/dl | 6.59±0.07 | 5.9-7.8 | 7.6±0.08 | 6-8 |
| Total calcium mg/dl | 9.55±0.19 | 7.1-11.8 | 11.2±0.3 | 6-12 |
| TF/TP mg/gm | 2.4±0.04 | 2.02-3.08 | 8.2±0.36 | 2.6-10 |
| PBF/TP mg/gm | 1.5±0.02 | 1.27-1.82 | 2.3±0.79 | 0.4-3 |
| PBH/TP mg/gm | 19.0±0.31 | 14.4-22.3 | 17.58±0.36 | 1.2-25 |
| Age(years) | 46.8±1.83 | 22-67 | 49.2±1.7 | 18-75 |

Pb statistics obtained by student - t- test. N.S = Non significant difference

Table 2 : Biochemical parameters of the studied group

The comparison between group I (Reference group) and group II (patients with breast cancer), shows significant increases in the level of serum total fucose, protein bound fucose, protein bound hexoses, total protein and total calcium. (Table 2 and Figures 2 and 3)

The mean±S.E value of total fucose to total protein ratio (TF/TP), protein bound fucose to total protein ratio (PBF/TP) and protein bound hexoses to total protein ratio (PBH/TP) were (2.4±0.04, 1.5±0.02 and 19.0±0.31)mg/gm respectively in normal subjects and (8.2±0.36, 2.3±0.79 and 17.58±0.36) mg/gm respectively, in patients with breast cancer. The mean values of TF/TP and PBH/TP in sera of breast cancer patients were significantly elevated when compared to the normal healthy subjects, while PBF/TP was higher in the reference group when compared to patients of breast cancer as shown in Table 2 and in the form of histograms in Figure 4.

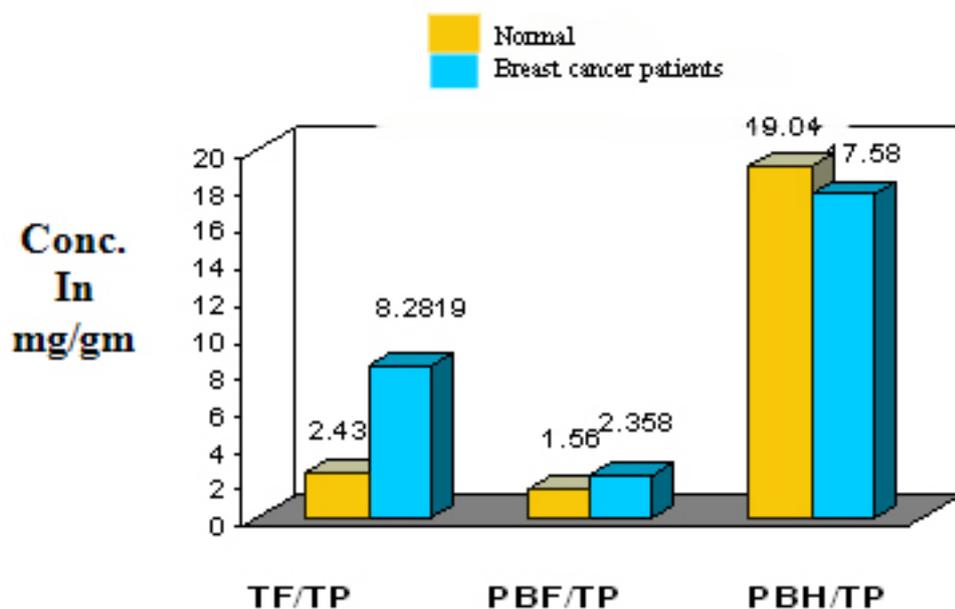


Figure 4: Comparison of serum total fucose, protein bound fucose and protein bound hexoses to total proteins ratio in normal and breast cancer patient

Protein bound hexoses, Total Protein and Total calcium in the clinical diagnosis of breast cancer.

biochemical parameters levels were in agreement with previous reports. (18,19,20,21,22,23,24,25)

Discussion and Conclusion

The goal of the present study was to understand usefulness of serum Total α-L- Fucose, Protein bound fucose,

In the present study we found that the patients with breast cancer had significantly higher levels (P<0.01) of total α-L- fucose, protein bound fucose in comparison with control group. The results of these

However the mean Protein bound hexoses level in breast cancer was significantly higher (P<0.01) than that of the reference group. This finding is similar to that found by other investigators(18,20,24,26).

| Breast | Statistical evaluation |
|--------|------------------------|
| range | |
| 120 | P<0.01 |
| 5-45 | P<0.01 |
| 0-162 | P<0.01 |
| 8-9 | P<0.01 |
| 8-19 | P<0.01 |
| 5-16.9 | P<0.01 |
| 7-5.48 | N.S |
| 6-22.2 | P<0.01 |
| 8-75 | N.S |

Also the mean total protein level was significantly higher ($P<0.01$) in patients with breast cancer compared to the control group. Similar results have also been reported.(18,23)

There are many possibilities of increased serum Total α -L- Fucose, Protein bound fucose, Protein bound hexoses and Total Protein in breast cancer, like increased glycosylation of serum glycoproteins, shedding of glycoproteins from the tumor cell surface and increased normal serum glycoproteins(17). Increased serum fucose concentrations in patients with cancer is also correlated with increases in certain acute phase proteins. Tumor itself may also contribute to circulating fucose concentration either by spontaneous release of glycoproteins as the mass grows or as a result of cell damage through host attack or treatment(24). A number of studies(27,28) have shown that malignant change may be accompanied by increasing expression of membrane associated fucose containing macromolecules. Furthermore, tumors can shed fucosyl containing components into their environment. Tumors may also contribute indirectly to serum fucose by promoting increased fucosylation of existing glycoproteins and increased fucosyltransferase values

have been noted in serum samples from patients with cancer(28).

The mean S. calcium level was significantly higher ($P<0.01$) in the breast cancer population compared to the reference group. Similar results have been reported.(29,30) Hypercalcemia is the result of pathological bone resorption caused by the secretion of cytokines that stimulate osteoclast differentiation and activity. One of these cytokines is parathyroid hormone-related protein (PTHrP). This PTHrP is also secreted by normal breast cells during lactation to increase bone resorption and liberate skeletal calcium stores for the purposes of milk production (30)

We have presented data indicating a relationship between human breast cancer and elevated serum fucose values. This test may be useful therefore as an additional follow up tool in those who have developed recurrent breast cancer and it may be equally applicable in the following: those patients who have had one mastectomy and are therefore a high risk group as regards developing carcinoma in this opposite breast. Generally, it is an additional piece of information to be weighed along with the physical diagnosis and perhaps mammography in making a decision for biopsy. As such it might represent another factor to aid in earlier detection of breast malignancy.

References

- 1- Carlos L, and Eleftherios P. Breast and Prostate Cancer: An Analysis of Common Epidemiological, Genetic, and Biochemical Features1. *Endocrine Reviews*, 1998.19 (4): 365-396
- 2- Jareer K.; Jason M., Han L., Norman M. Greenberg , Hyung-Gyoon Kim and Alan W. A Role for Phospholipase C- mediated Signaling in Tumor Cell Invasion1 *Clinical Cancer Research*, 1999.Vol. 5, 2251-2260 .
- 3- Dawn B .Marks . Allan D Marks and Colleen M Smith. *Basic medical biochemistry a clinical approach* Williams and wilkins , 2004.
- 4- BU Gronder L and De Young . *Undamentals and clinical applications*

a nursing approach 3rd Mosby ,2004. P. 262

- 5- Robert K. Murray R.K. *Harper's biochemistry* ,2002
- 6- Martx JD . *Many gene changes found in cancer . Science* ,1999.246:1386-1390.
- 7- Arson SA . *Growth factor and cancer .Science*,1991 .254:1147-1150.
- 8- Mondoa, Emil I. MD and Mindy Kitei. *.Sugars that Heal. Ballantine Publishing*,2001.
- 9- Tsuj T Oswa . *Structure of carbohydrate chains of membrane glycoproteins oh human platelets .J. biochemistry* , 1986.100: 1387-98.
- 10- Daniel JB and John BL .*Fucose biosynthesis and biological function in mammals . glycobiology* ,2003.13(7):41-53.
- 11- Danial , W.W. *Biostatistics: A foundation for analysis in the health science 3rd .John wiley*,1983.
- 12- Dische Z. and Shettle .*Determination of Fucose L. J .biol. chemistry* ,1948.175:595-603.
- 13- Francis ERosatoMD,face, marry S cancer ,1940. 28: 1575-1579
- 14- Riming to C J .*Biochemistry* ,1940 .34:931
- 15- B.L. Oser Hawk's *physiological chemistry 14th ed. 179-181.Mc Graw-Hill, New York, 1965.*
- 16- Lorentz K . *Improved determination of serum calcium with 2-cresolphthalein complex one .Clin Chemi.Acta*,1982. 126:327-334.
- 17- Turner GA ; Skillen AW; B Unmah P et al .*Relation between raised concentrations of fucose , sialic acid and acute phase proteins in serum from patients with cancer : choosing suitable serum glycoprotein markers : J. Clinical pathology* ,1985.38:588-592.
- 18- France F ,Rosato M . *Serum fucose in the diagnosis of breast cancer . Cancer*,1971. 28:1575-1579
- 19- Ibraham S and Sheh A . *Serum protein boun fucose levels in certain chronic disease a clinical statistical study clinica chemical acta*, 1990. 170-180
- 20- Waalkes TP, Mrochek JE, Dinsmore SR, Tormey DC. *Serum protein-bound carbohydrates for following the course of disease in patients with metastatic breast carcinoma. J. Natl cancer Inst* ,1978. Sep;61(3):703-7

- 21- Kiricuta I, Bojan O, Comes R, Cristian R. Significance of serum fucose, sialic acid, haptoglobine and phospholipids levels in the evolution and treatment of breast cancer. Arch Geschwulstforsch., 1979.49(2):106-12.
- 22- Tatsumura T, Sato H, Mori A, Komori Y, Yamamoto K, Fukatani G, Kuno S. Clinical significance of fucose level in glycoprotein fraction of serum in patients with malignant tumors. Cancer Res. ,1977. Nov;37(11):4101-3
- 23- Waalkes TP, Gehrke CW, Tormey DC, Woo KB, Kuo KC, Synder J, Hansen H. Biologic markers in breast carcinoma. IV. Serum fucose-protein ratio. Comparisons with carcinoembryonic antigen and human chorionic gonadotrophin. Cancer. ,1978. 41(5):1871-82.
- 24- Turner GA, Skillen AW, Buamah P, Guthrie TD, Welsh TJ, Harrison J, Akowalski A. Relation between raised concentrations of fucose, sialic acid, and acute phase proteins in serum from patients with cancer: choosing suitable serum glycoprotein markers J Clin Pathol, 1985.38:588-592
- 25- Mrochek JE, Dinsmore SR, Tormey DC and Waalkes TP. Protein-bound carbohydrates in breast cancer. Liquid-chromatographic analysis for mannose, galactose, fucose, and sialic acid in serum. Clinical Chemistry, 1978.(22) 1516-1521
- 26- Bradley WP, Blasco AP, Weiss JF, Alexander JC Jr, Silverman NA, Chretien PB. Correlations among serum protein-bound carbohydrates, serum glycoproteins, lymphocyte reactivity, and tumors burden in cancer patients. Cancer. 1977.40(5):2264-72.
- 27- Turner GA, Guy D, Latner AL, Sherbet GV. Cell surface changes associated with the selection of spontaneous metastasis. clinical and experimental aspects. The Hague: Nijhoff, 1980 : 222-6.
- 28- Kim YS, Kim YW, Siddiqui B, Tsao D. Membrane-associated, fucose-containing glycoproteins and glycolipids of cultured epithelial cells from human colonic adenocarcinoma and fetal intestine. Eur J Cancer Clin Oncol ,1982.18:1329-36.
- 29- DeMauro S, Wysolmerski J. Hypercalcemia in breast cancer: an echo of bone mobilization during lactation? J Mammary Gland Biol Neoplasia.2005.10(2):157-67
- 30- Coombes, RC, Powles TJ, Joplin DG. Calcium metabolism in breast cancer. Proc R SocMed.1977..70(3):195-9.
-
- References continued from *Can clinical breast examination demonstrate improved breast self-examination?* page 19)
11. McDonald S, Saslow D, Alciati MH. Performance and reporting of clinical breast examination: a review of the literature. CA Cancer J Clin 2004; 54:345-361.
12. Fenton JJ, Rolnick SJ, Harris EL, Barton MB, Barlow WE, Reisch LM, Herrinton LJ, Geiger AM, Fletcher SW, Elmore JG. Specificity of clinical breast examination in community practice. J Gen Intern Med.2007 March; 22 (3):332-337.
13. Kayode FO, Akande TM, Osagbemi GK. Knowledge, attitude and practice of breast self examination among secondary school teachers in Ilorin, Nigeria. European Journal of Scientific Research 2005;10(3): 42-47.
14. Nwagbo DF, Akpala CO. Awareness of breast cancer and breast self examination among women in Enugu Urban, Eastern Nigeria. J Coll. Med. 1996;1: 34-36.
15. Balogun MO, Owoaje ET. Knowledge and practice of breast self examination among female traders in Ibadan, Nigeria. Annals of Ibadan Postgraduate Medicine 2005;3(2):52-56.
16. Brain K, Norman P, Gray J, Mansel R. Anxiety and adherence to breast self-examination in women with a family history of breast cancer. Psychosomatic Medicine 1999; 61: 181-187.
17. Thomas DB, Gao DL, Self SG, Allison CJ, Tao Y, Mahloch J, et al. Randomized trial of breast self-examination in Shanghai: methodology and preliminary results. J Natl Cancer Inst. 1997 Mar 5; 89 (5): 355-365.
18. Iannotti RJ, Finney LJ, Sander AA and De Leon JM. Effect of clinical breast examination training on practitioner's perceived competence. International Society for preventive oncology, 2002;26 (2):146-148.
19. Ferro S, Caroli A, Nanni O, Biggeri A, Gambi A. A randomized trial on BSE in Faenza (Northern- Italy). Tumori. 1996 Jul-Aug; 82 (4): 328-34.

Can clinical breast examination demonstrate improved breast self-examination?

A. M. Ogunbode (1)

A.A. Fatiregun (2)

M.M.A Ladipo (1)

(1) Department of Family Medicine, General Outpatients' Department, University College Hospital, Ibadan (2) Department of Epidemiology, Medical Statistics and Environmental Health, College of Medicine, University of Ibadan, Nigeria

Correspondence:

Dr. Adetola M. Ogunbode

Department of Family Medicine, General Outpatients' Department, University College Hospital (U.C.H.), Ibadan.

PMB 5116, Agodi Post office, Ibadan, Oyo State, Nigeria.

Email: jamchose@yahoo.co.uk

ABSTRACT

Background and Objective: Early detection and treatment of breast cancer can help to decrease the burden globally. In the developing world, screening methods include breast self examination and clinical breast examination. This study aims to evaluate the effect of clinical breast examination demonstration on improving breast self- examination (BSE) techniques.

Methods: Adult women were randomly assigned to either a poster-teaching on BSE and a clinical breast examination (CBE) demonstration group (intervention) or a poster-teaching on BSE only, group (control). Repeated measure analysis of variance (ANOVA) was used for analysis.

Results: One hundred and forty women participated; 68 in the intervention group and 72 in the control group. The mean BSE score observed was higher in the intervention group than the control group at pre-intervention (2.93 ± 0.89 and 2.79 ± 0.86); at immediate post-intervention (4.92 ± 0.99 and 4.74 ± 1.17), and

at one week post intervention (5.13 ± 1.11 and 4.93 ± 1.08) respectively. The test of within subject (study period) was significant at $p=0.001$.

Conclusion: A combination of CBE demonstration and poster health education on BSE did not provide an additional advantage over health education alone on improving BSE technique. Health workers should offer education on BSE technique, to all women.

Keywords: clinical breast examination, breast self-examination, primary care, Nigeria

Introduction

Ten million people are diagnosed with cancer and more than 6 million die of cancer every year. (1) Breast cancer causes 376,000 deaths a year worldwide, and about 9,000,000 women are diagnosed every year with the disease. Deaths from breast cancer are also highest in the United Kingdom, where about 42,000 new cases are diagnosed annually, with a mortality rate of 15,000 per annum.(2) Breast cancer is the second most common cancer (10.4 percent of all cancers), with lung cancer being the commonest in the world (12.3 percent). (1) The incidence rate of breast cancer in Nigeria has steadily increased from 15.3 per 100,000 in 1976 to 33.6 per 100,000 in 1992.(3)

The morbidity and mortality caused by breast cancer can be reduced through early detection and treatment.(4) There are several screening methods for detection of breast cancer, such as detection of breast cancer susceptibility genes-breast cancer markers type 1 and 2-(BRCA1, BRCA2), mammography, clinical breast examination (CBE), and breast self- examination (BSE).(5) Screening refers to the application of a test to people who are as yet asymptomatic for classifying them with respect to

their likelihood of having a particular disease.(6) An ideal screening test should be simple, inexpensive and effective. BSE fulfils the first two criteria of a screening test, but early results of two randomised trials conducted in Russia and China suggested that it would not be effective in reducing mortality from breast cancer. CBE is also relatively simple and inexpensive, but its effectiveness in reducing mortality from breast cancer has not been directly tested in a randomised trial. Mammography is complex, expensive, and only partially effective.(7)

CBE requires no specific instrument other than the physicians' fingers, and is currently the only available non-invasive technique at the disposal of the surgeon in the assessment of breast lumps in Nigeria.(8) CBE seeks to detect palpable breast cancers at an earlier stage of progression, when treatment is more effective and treatment options are greater than for later stage disease.

On the other hand, BSE is one of the important steps for identifying breast disease at an early stage, by the woman herself. BSE is recommended for breast cancer screening, but most Nigerian women do not perform BSE regularly.(9) BSE is an inexpensive screening method for a resource-constrained country like Nigeria and can easily be taught. BSE is also a non-invasive method for early detection of breast disease.(10) The lack of randomised trials demonstrating CBE's independent contribution to reduce mortality have raised questions about the value of CBE as a screening tool for breast cancer. Historically, a significant number of breast cancers were detected by CBE alone. CBE may contribute to the earlier detection of breast cancer in women under the age of 40 years, for whom mammography is not recommended, and among women who participate in regular screening.(11)

Given the level of uncertainty, most screening guidelines either recommend CBE as a complement to

mammography, or do not recommend for or against its use.(11) However, with limited access to mammography in developing countries, CBE may be the only practical means of population-based breast cancer screening.(12) Finally, it should be remembered that mammography is not an appropriate technology for screening in the developing world. Wanting to mimic 'high tech' medicine in public health diverts scarce resources from simpler interventions that might have a far greater benefit to society.(9) Several studies have been done on BSE practice,(7,10,13,14) but few, especially in the developing countries, have looked at the effect of CBE demonstration on improving BSE technique. This study was designed to bridge that gap. The objective was to evaluate the effect of CBE demonstration on improving BSE techniques among women attending a Nigerian primary care clinic.

Methods

A randomised controlled open trial study design was employed. One hundred and forty women who attended the General Outpatients Department University College Hospital, Ibadan, Nigeria between August 2008 and September 2008, were enrolled for the study. The study participants were randomised to one of two study groups;

A, the poster-teaching (control) group and

B, the poster-teaching and CBE demonstration (intervention) group. The study protocol and informed consent were approved by the Institutional Review Board (IRB) of the hospital. Clinical trial registration number-NHREC/05/01/2008a

The inclusion criteria for randomisation were women over 18 years, presenting to the clinic for the first time, irrespective of the complaint. However, women who were too ill to go through the rigours of the study, women having medical or surgical emergencies, pregnant women and women with breast cancer were excluded.

An allocation sequence was generated by a trained research assistant in randomisation blocks of four, using the table of random numbers. There were six ways in which intervention could be allocated. The permutation was as follows: 1.AABB 2.ABAB 3.ABBA 4.BBAA 5.BABA 6.BAAB, where A and B represented the study groups. As the patients presented, they were allocated to either A or B group, following the permutation.

A structured questionnaire designed to collect data on socio demographic characteristics, and observation score of BSE technique was administered at interview and used for data collection. All interviews and scoring was done by the first author. Baseline assessment was carried out, and the participant was scored on the technique for BSE. The intervention was then carried out: group A was taught with the poster on BSE technique, while group B had both the poster-teaching on BSE and CBE demonstration performed on them. The poster showed a woman undressed to the waist and standing in front of a mirror, and demonstrated the finger technique and the circular search pattern.

Participants were counselled about the CBE technique and its probable outcome before a demonstration. CBE demonstration was done for every woman in the intervention group. The woman was requested to undress in the examination area, and her breasts were examined first sitting upright on the examination couch, to check for breast symmetry and breast skin changes. The woman was asked to lie down on the examination couch and the breasts examined with the tip of the fingers (middle, ring, and index fingers), quadrant by quadrant, checking for breast lumps. The axilla was also examined with the woman in the lying down position. Immediately post-intervention and one week post-intervention, during the follow-up visits, participants were requested to perform the BSE technique again, and this was scored.

Improvement in the mean BSE scores between the two groups of women was the primary outcome, while improvement in the BSE scores immediately after the intervention; and one-week post-intervention was the secondary outcome. A maximum score of 15(14) was allotted and distributed into -1 to 3 marks, allocated to whether or not the patient performed the technique of BSE correctly. If any breast pathology was detected, the participants were referred to the General Surgeons within the hospital.

The data collected were coded serially and entered into a computer using the software programme; Statistical Package for Social Sciences (SPSS) for data analysis, version 12. Discrete variables were summarized using proportions and continuous variables using means and standard deviations. Comparison of baseline variables between the two groups was carried out using independent t-test for continuous measures and Pearson chi-square test for categorical measures. Repeated measure analysis of variance (ANOVA) was used to compare baseline BSE mean scores, immediate post-intervention mean BSE scores, and one-week post-intervention mean scores between groups and within groups (trial periods). The level of significance was set at $\alpha = 0.05$.

Results

There were 72 participants in the control group, and 68 in the intervention group. Table 1 shows the socio-demographic characteristics of the respondents in the two groups.

The observed BSE technique mean scores between the control and the intervention group at baseline (2.79 ± 0.86 and 2.93 ± 0.89), immediate post-intervention (4.74 ± 1.17 and 4.92 ± 0.99) and one-week post intervention (4.93 ± 1.08 and 5.13 ± 1.11) were not statistically different; $p=0.53$, 0.29 and 0.45 respectively. Figure 1 shows the trends in mean BSE scores, in both the control group (A) and the intervention group (B).

The observed BSE technique mean scores between the control and the intervention group at baseline (2.79 ± 0.86 and 2.93 ± 0.89), immediate post-intervention (4.74 ± 1.17 and 4.92 ± 0.99) and one-week post intervention (4.93 ± 1.08 and 5.13 ± 1.11) were not statistically different; $p=0.53$, 0.29 and 0.45 respectively. Figure 1 shows the trends in mean BSE scores, in both the control group (A) and the intervention group (B).

Repeated measure ANOVA test of hypotheses indicated there was no difference in BSE technique scores between the control group and the intervention group ($p=0.31$). The within subject test however indicated a statistically significant difference between observed BSE technique scores at pre-intervention, immediate post intervention and one-week post intervention ($p=0.001$). However, no interaction was demonstrated between the study phases and intervention group ($p= 0.93$).

Discussion

BSE and CBE are important screening tools for breast cancer in women. The majority of the women in both the control group and the intervention group were married. This was comparable to other studies done on BSE, in which most of the respondents were married. (13, 15) The majority of the respondents in both the control group and the intervention group in this study had secondary education and above. To corroborate this, a study reported that a majority of respondents was either married or cohabiting and had gained qualifications at the secondary educational level and above.(16) This study is also similar to the study by Kayode (2005) in which the majority of the respondents had University degrees, but differs from that of Balogun (2005) in which the majority had secondary education and below.(13,15)

A third of the respondents in this study in both the control group and the interventional group were traders. Several other studies have targeted groups such as market women, teachers, nurses, students,

housewives, civil servants and nurses included. (13-15) The high number of Yoruba respondents may be due to the fact that the study location was in a hospital in the southwest, with predominant Yoruba ethnic group.

This study in which the control group had health education on BSE only, while the intervention group had health education on BSE; and CBE demonstration, showed an increase over time of the mean value of the score between the study period, that is BSE pre-intervention, BSE immediate post-intervention and BSE one-week post intervention for both the control and intervention groups. This is in agreement with another trial on BSE, which reported that over time, there was a greater proficiency in BSE practice.(17) Teaching alone on BSE may be effective in improving BSE technique, and CBE demonstration does not offer any marginal advantage. There is therefore, a need for health workers to improve their knowledge of the techniques of BSE.(14)

Thomas et al, in a large randomised trial of breast self-examination initiated in Shanghai, China, on 267040 current and retired female employees reported that compared to the control group, women in the instruction group demonstrated greater proficiency in BSE practice, although the absolute level of proficiency achieved was moderate.(17) Effective CBE training will not only improve screening techniques but also reduce barriers to performing CBE by increasing perceived competence and self-efficacy.(18) The findings of this study also agree with a randomised controlled trial which was done to compare two methods for teaching BSE: theoretical and practical session versus mailed material. The first outcome of the trial was a change in practice of BSE, and the study showed no difference between the treatment and control group. The second outcome was a change in the quality of BSE practice, and this showed that women of the treatment group improved the quality of BSE practice more than the control group, $p<0.01$.(19)

| VARIABLE | Category | Control group n=72 (%) | Intervention group n=68 (%) | Total N=140(%) | p- value |
|--------------------|----------------------|-----------------------------------|--|---------------------------|---------------------|
| Age (Years) | <30 | 22(30.6) | 28 (41.2) | 50(35.7) | 0.32 |
| | 30 – 39 | 19(26.4) | 20(29.4) | 39(27.9) | |
| | 40 – 49 | 17(23.6) | 13(19.1) | 30(21.4) | |
| | 50+ | 14(19.4) | 7 (10.3) | 21(15.0) | |
| Marital Status | Single | 19 (26.4) | 22 (32.4) | 41 (29.3) | 0.50 |
| | Married | 50 (69.4) | 45 (66.2) | 95 (67.9) | |
| | Separated | 3 (4.2) | 1 (1.4) | 4 (2.8) | |
| Level of Education | Non-formal education | 3 (4.2) | 3 (4.4) | 6 (4.3) | 0.99 |
| | Primary | 11 (15.2) | 9 (13.2) | 20(14.3) | |
| | Secondary | 21 (29.2) | 21(30.9) | 42 (30.0) | |
| | Tertiary | 37 (51.4) | 35(51.5) | 72 (51.4) | |
| Occupation | Trader | 34 (47.2) | 28 (41.1) | 62 (44.3) | 0.72 |
| | Civil Servant | 15 (20.8) | 17 (25.0) | 32 (22.9) | |
| | Student | 13 (18.1) | 15 (22.1) | 28 (20.0) | |
| | Others | 10 (13.9) | 8 (11.8) | 18 (12.8) | |
| Religion | Christian | 52 (72.2) | 38 (55.9) | 90 (64.3) | 0.33 |
| | Islam | 20 (27.8) | 30 (44.1) | 50 (35.7) | |
| Ethnic Group | Yoruba | 63 (87.5) | 55 (80.9) | 118 (84.3) | 0.33 |
| | Igbo | 5 (6.9) | 10 (14.7) | 15 (10.7) | |
| | Hausa | 4 (5.6) | 3 (4.4) | 7 (5.0) | |

Table 1: Comparison of distribution of socio-demographic characteristics between the control group and the intervention group

In conclusion, CBE and poster health education on BSE did not provide an additional advantage over health education on BSE alone on improving BSE technique. Ninety percent of breast cancers are more frequently found by women themselves rather than by a physician during a routine examination, so health education on BSE technique should be taught to women by health workers.(13) Primary care physicians should use the opportunity of first contact with the women, to teach BSE.

Acknowledgement

We appreciate our colleagues at the General Outpatients' Department and Department of Epidemiology, Medical Statistics and Environmental Health, for their encouragement. We also thank the nursing staff and the paramedical staff in the G.O.P.D. The participants of this study are also to be commended for their cooperation during the study. Most important are our families, thanks for all the support.

References

1. Park K. In Park's Textbook of Preventive and Social Medicine. 2007. Nineteenth edition. Banarsidas Bhanot Publishers Jabalpur, India. 318-327.
2. Umeh HN. Principles of Management of breast cancer and its implications in a developing Nation. Port Harcourt Medical Journal 2006; 1:1-7.
3. Gukas ID, Jennings BA, Mandong BM, Igun GO, Girling AC, Manasseh AN, et al. Clinicopathological features and molecular markers of breast cancer in Jos, Nigeria. WAJM July-September, 2005;24(3):209-213.
4. Ohene-Yeboah MOK. An audit of excised breast lumps in Ghanaian women. WAJM 2005; 24(3): 252-255.
5. Abudu EK. Breast cancer susceptibility genes: A molecular policeman and critical gatekeeper gene. NCR Sept./ Oct.2005;9(5):14-16.
6. Pindiga UH, Deba BU, Dogo D. Fine needle aspiration in the assessment of breast lumps in Maiduguri, North Eastern Nigeria. The Nigerian Journal of Surgical Research, 1999; 1(2):72-75.
7. Mbanaso AU, Adisa AC, Onuoha C, Mbanaso CI. Status of breast self examination among health professionals of Abia State University Teaching hospital. Journal of Experimental and Clinical Anatomy 2005; 4 (1):55-57.
8. Hennekens CH, Buring JE. 1987. Epidemiology in Medicine. ISBN 0-316-35636-0. First Edition. Boston\Toronto: Little Brown and Company. Chapter 13. Screening. 327-47.
9. Mitra I, Baum M, Thornton H, Houghton J. Is clinical breast examination an acceptable alternative to mammographic screening? BMJ (28 October) 2000;321:1071-1073.
10. Chirdan OO, Akosu JT. The practice of self breast examination among women attending Primary Health Care Centers in Jos North Local Government area of Plateau state Nigeria. The Breast Journal July 2006;12(4):389-390 .

(Continued page 8)



Under the Directives of
H. H. Sheikh Mohammed Bin Rashid Al Maktoum
 Vice President and Prime Minister of the United Arab Emirates and Ruler of Dubai



Under the Patronage of
H.H. Sheikh Hamdan Bin Rashid Al Maktoum
 Deputy Ruler of Dubai, Minister of Finance
 President of Dubai Health Authority

It's All About Hospitals !



**8 - 10
 November 2011**

ATLANTIS
 The Palm, Dubai

World class exhibits
 await all visitors

**CALL FOR ABSTRACTS
 DEADLINE FEBRUARY 2011**

**Early Registration
 Rates Now!**
 Contact us at ;
www.ihfdubai.ae
ihfdubai@index.ae



Organised by
INDEX® Conferences & Exhibitions Organisation Est.
 P.O. Box: 13636, Dubai, UAE | Ibn Sina Bldg. # 27 | Block B
 Office 203 | Dubai Healthcare City
 Tel +971 4 362 4717 | Fax +971 4 362 4718 | E-mail ihfdubai@index.ae

Medical personnel's knowledge and technical skills in using a metered dose inhaler

Shrestha Ashis

Correspondence:

Shrestha Ashis MBBS, MD (General Practice)
Registrar OPD/ER Department, Patan Hospital, Nepal
Phone: 977-9851061846
Email: ashis_ktm@yahoo.com

Introduction

Asthma and chronic obstructive airway disease (COAD) are chronic inflammatory disorders of the airways which are usually associated with widespread airway obstruction. These contribute a large proportion of the burden of respiratory diseases. Asthma accounts for about 1 percent of disability adjusted life year loss(1).

Current treatment strategies for asthma and COAD emphasize the role of self-administered inhalation therapy(2,3,4). The regular use of inhaled anti-inflammatory agents with inhaled b-agonists for rescue is now considered to be the cornerstone of optimal long-term therapy.

The use of hand-held inhalation devices provides a rapid, cost-effective, and safe method of delivering drugs to the lung. Treatment of pulmonary disease with inhaled aerosol drugs offers advantages over systemic therapy, including a more rapid onset and reduced adverse effects, with both bronchodilators and corticosteroids, because of direct targeting of the lungs(5,6). Inhaled medications are intended to exert localized, site-specific therapeutic effects on the bronchioles(7). Successful therapy is dependent on the proper deposition of the drug in the lung, although some effects can arise from drug either deposited in the oropharynx and absorbed locally, or swallowed and absorbed from the gastrointestinal tract(8,9,10).

Even with the best inhalation technique, only 10 to 15 percent of the aerosol actually reaches the lung(8,9,10). Clinically important problems arise when patients fail to use the MDI properly, often mistiming inhalation and canister actuation(11,12). Several studies have shown that 24 to 89 percent of patients have poor technique when using the MDI(13-16). The misuse of MDIs can have important

ABSTRACT

Background: Use of Metered Dose Inhaler device (MDI) in Asthma and Chronic Obstructive Airway Disease (COAD) provides a rapid, cost-effective and safe method of delivering drugs to the lung. Clinically important problems arise when patients fail to use the MDI properly. To remedy this problem, patient education by medical personnel has been recommended. This study is designed to survey medical personnel knowledge and technical skills in using MDI.

Subjects and Methods: The study duration was five months. Data was collected from five tertiary level hospitals in Kathmandu Valley. A standard questionnaire was used to assess knowledge and a check list was used to assess technical skills.

Results: 127 medical personnel took part in the study. Average knowledge of medical personnel was 42.8% and technique was 59.18%. No significant difference was observed between male and female. However significant difference in knowledge was observed in age <30 years (48.3%) and > 30 years (38.6%). None of the medical personnel knew correctly, how to count numbers of doses in MDI.

Conclusion: Medical personnel lack knowledge and technical skill using MDI devices without which they cannot effectively educate patients. All medical personnel should be specifically trained to upgrade their knowledge and technical skills.

Key Words: Staff knowledge, Inhaler device, Metered dose inhaler

consequences, such as decreased efficacy, increased adverse effects, and increased cost generated from unnecessary use(17,18).

To remedy this problem, patient education by medical personnel has been recommended(9,15,19,20). However there is no official training or workshop to train medical staff in the proper use of inhaler devices. Few studies have assessed the ability of medical personnel to use inhaler devices(21-25). The following study has been designed to survey medical personnel's knowledge and ability to use a meter dose inhaler device.

Aims and Objectives

The aim of this study was to evaluate medical personnel's knowledge and technical skill in using a metered dose inhaler device. This study also correlated the knowledge and technical skills of the medical persons. The association of age, sex and qualification of the medical person was also studied.

Materials and Methods

This is a descriptive cross sectional study conducted with the 127 medical personnel working at five different tertiary level hospitals in Kathmandu (Patan Hospital, Nepal Medical College, Kathmandu Medical College, Institute of Medicine, Birendra Army Hospital). The medical personnel were contacted personally on working days and interviewed. The study was conducted during 5 months from June 2008 to November 2008. Medical officers (not yet on post graduate program) working in the emergency department, the medical department, post graduate resident training in the general practice, internal medicine as well as pharmacists took part in the study. Those not giving consent were excluded. Medical personnel interviewed were assured that this was not an evaluation of their work. Knowledge was assessed using a set questionnaire. Technique was assessed individually asking them to demonstrate using a dummy inhaler. The researcher used a check list to assess technique. Participants were interviewed in the afternoon and the

interview was conducted without interruption. An effort was made to ensure the atmosphere during the interview was relaxed. Participants were kept blinded to the content of the survey until the time of interview. The interview was confidential.

Data was analyzed by simple statistical means like proportion, mean and the total numbers. Student's t test, ANOVA and chi-square tests were applied. Corrected chi-square test was used wherever required and indicated. All data processing was done using SPSS version 15.0.

Result

A total one hundred and twenty seven (n=127) medical personnel were interviewed. Out of different medical practitioners interviewed 105 (83%) were male and 22 (17%) were female. Of 127 participants 32.3% were medical officers, 23.6% were GP residents, 33.9% were medical residents and 10.2% were pharmacists.

Figure 1 (opposite page) describes the proportion of medical personnel in each designation giving answers correctly. None of the medical personnel knew how to determine when a MDI was empty (K1) and how to clean a MDI (K2). Most medical personnel knew the importance of rinsing the mouth after using steroid MDI (K3) and order of use of beta agonist and steroid (K4).

Mean knowledge score of personnel under 30 years was 48.3% and that of personnel aged more than 30 years was 38.6%. Comparison of mean using T test showed statistically significant difference, $P < 0.05$. Comparison of categorized knowledge score (Poor, Fair, Good) using Chi square test showed no statistically significant difference between age group and categorized knowledge score, $P > 0.05$. Mean knowledge score of males were found to be 42.9% and that of females were 42.3%. Comparison of mean using T test showed no statistically significant difference, $P > 0.05$. Comparison of categorized knowledge score was also done

using Chi square test which showed no statistically significant difference between sex and categorized knowledge score, $P > 0.05$. Mean Knowledge scores of Medical officers were found to be 47.02%, General Practice Residents 47.73%, Medical Residents 38.95% and Pharmacists 30.77%. Total correct response by all medical personnel was 42.80%. Descriptive statistics obtained from ANOVA regarding knowledge scores of medical personnel in different designations were statistically significant, $P = (0.032)$. Comparison of categorized knowledge score was also done using Chi square test. The difference observed was statistically not significant $P > 0.05$.

Technical expertise was seen in initial steps which gradually decreased on later steps. All medical personnel failed to position the MDI correctly by tilting head back or keeping at level (T4). All medical personnel remembered to open the cap (T1) and held the MDI upright (T3). The pattern of response from all medical personnel was the same.

Mean technique score personnel of aged less than or equal to 30 years was found to be 60.11% and that of those age more than 30 years was 58.9%. Comparison of mean using T test showed no statistically significant difference, $P > 0.05$. Comparison of categorized technique score (Poor, Fair, Good) was also done using Chi square test which showed no statistically significant difference between age group and categorized knowledge score, $P > 0.05$. Mean technique score of males was found to be 59.1% and that of females was 59.59%. Comparison of mean using T test showed no statistically significant difference, $P > 0.05$. Comparison of categorized technique score was also done using Chi square test which showed no statistically significant difference between sex and categorized technique score, $P > 0.05$. Mean technique scores of Medical officers were found to be 47%, General Practice Residents 47%, Medical Residents 38% and Pharmacists 30%. Total correct technique demonstrated was 59.18%.

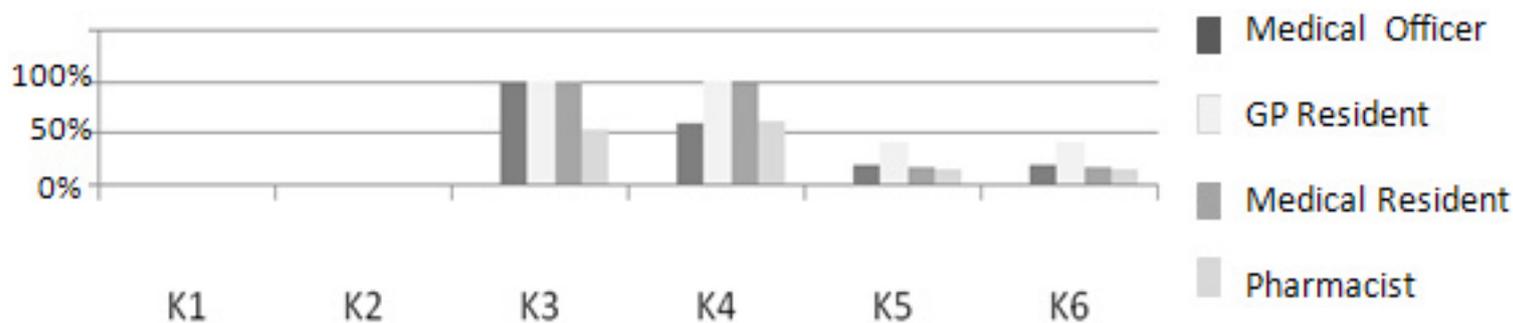


Figure 1: Proportion of correct responses made by different medical personnel

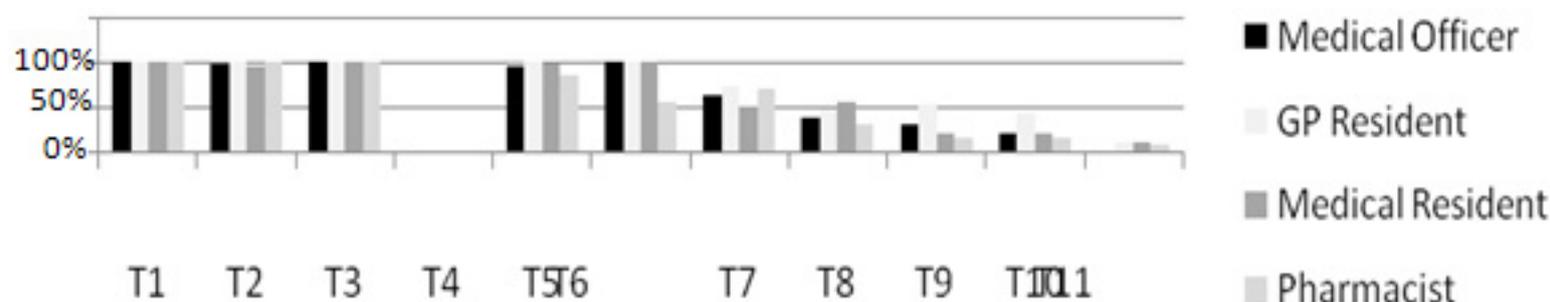


Figure 2: Graphical representation of steps performed correctly by different medical personnel

| Background Variables | N | Pearson Correlation (r) | P Value |
|----------------------|-----|-------------------------|---------|
| Total | 127 | 0.552 | < 0.01 |
| Age ≤ 30 | 54 | 0.290 | < 0.05 |
| Age >30 | 73 | 0.784 | < 0.01 |
| Male | 105 | 0.562 | < 0.01 |
| Female | 22 | 0.500 | < 0.05 |
| Medical Officers | 41 | 0.138 | > 0.05 |
| GP Residents | 39 | 0.853 | < 0.01 |
| Medical Residents | 43 | 0.860 | < 0.01 |
| Pharmacist | 13 | 0.706 | < 0.01 |

Table 1: Correlation between Knowledge and Technique by standard variable

Descriptive statistics obtained from ANOVA regarding technique scores were statistically significant, $P = (p = 0.001)$. Comparison of categorized technique score was also done using Chi square test. The difference observed was not statistically significant between designation and categorized knowledge score, $P > 0.05$.

Bi-variate correlation analysis was done. Positive correlations were seen in terms of Knowledge and Technique score as per different base variable. All were statistically significant except the correlation of medical officer.

Discussion

The important role played by medical professionals in repeatedly instructing and monitoring of patients for the optimal use of inhaled medicines has often been emphasized.(26) However, our data shows many of these medical personnel lack rudimentary skills and many lack elementary and theoretic knowledge about their use. This may reflect the lack of formal training in professional schools or postgraduate training programs in Nepal. Of the medical and paramedical staff tested, the ability to use MDI varied significantly.

A number of studies have shown a lack of knowledge of correct MDI use on the part of health-care professionals. Interiano and Guntupalli concluded house staff and nurses were less proficient than respiratory therapists in use of the MDI, with 43%, 4%, and 85% respectively. (27) Numerous studies have documented poor MDI technique by patients both young and old(28). The result of our study would offer at least one explanation for poor MDI usage by patients. The frequent inability of a physician and some non-physician medical staff to use inhaling devices would result in poor instruction of patients with consequent poor patient technique. At the time when patient education is being emphasized in self management schemes, this lack of basic knowledge by medical staff is regrettable and must be addressed. Our study confirms and extends these findings, showing that medical

personnel lack knowledge and technical skills.

Teaching the patient how to use MDIs correctly is not sufficient. Reinforcing the inhalation technique is of utmost importance. This is team work where medical professionals should take part actively. One of the common situations that were encountered during data collection was most of the doctors advise patients to learn the inhaling technique from the pharmacy. Our data shows that knowledge and technique of pharmacists was not optimal' so patients are not learning proper inhalation technique. There is an urgent need to arrange training sessions for medical as well as paramedical staff. Alternatively, trained respiratory therapists should be introduced, though this may not be feasible in Nepal at present.

Another practical problem was difficulty in determining the number of doses remaining in the device. None of the medical professionals were aware of the maximum number of actuations listed by the manufacturer for their MDI. Counseling the patient to replace the MDI before it is empty is one of the ways to prevent exacerbations. For this, a medical practitioner should know when to arrange the follow-up or how long the inhaler device will last. The common answer given was, "by shaking' or "when nothing comes out". This is a crucial issue. In a country like Nepal where patients come to hospital walking for a day or two, the patient will remain without medicine during those days. Also MDIs can release an aerosol plume with little or no drug beyond the maximum number of puffs. Patients can under dose using this method.

McFadden cataloged the frequency of patient errors with MDIs, based on 12 studies, involving 955 subjects who committed 1,536 errors. One of the frequent MDI errors was failure to coordinate actuation with inhalation. (28) MDI devices require actuation to be co-ordinated with the beginning of inspiration for maximum benefit. In this study initial steps were well performed (step 1-5) while later steps (step 6-11) were poorly performed

by all medical professionals. The most commonly made mistakes on these steps were actuation prior to inhalation and actuation late in the inspiratory cycle. Actuation prior to inhalation reduces inhaled mass by 90%. Similarly actuation at total lung capacity fills the anatomical dead space with aerosol, which is then exhaled before it can enter the target airways.

Other common problems observed were firing MDI in mouth and inhaling through nose, inspiratory flow too rapid, breath hold too short and actuation without inspiration. Shaking MDIs is required to assure homogenous mixing of the various ingredients in the canister, which can settle out or layer over time. On observation was almost all medical practitioners shake the MDI initially but forget to shake before firing for the second time.

This study shows that the average knowledge of medical persons is 42.8% and technique is 59.18%. No significant difference was observed between male and female in terms of knowledge and technique. However significant difference was observed between the age category <30 years (48.3%) and > 30 years (38.6%) in terms of knowledge, but no significant difference was observed in technical skills. One possibility is medical persons do not revise the knowledge that they have learnt in medical school so they tend to forget with time. However they retain some skills due to everyday practice. A significant difference was also noted in terms of medical professions of different designation. Knowledge and technical skills have shown positive correlation in all except for medical officers. This is probably because medical officers who have just graduated from medical school have good knowledge, however they lack technical skills as they are not so much in practice. This stresses the fact that a medical person should have proper knowledge and technical ability for proper teaching to the patient.

This study highlights the fact that medical professionals lack adequate

knowledge and technique in using MDI. The most probable reason is inadequate teaching sessions and trainings. One possible solution is to conduct teaching sessions in medical schools or training sessions for medical professionals.

In analysis and review of improper MDI techniques McFadden suggested several options: holding chamber of spacer, breath actuated pMDI and breath actuated dry powder inhaler. Each of these devices was intended to simplify MDI use especially the problem of actuation-inhalation coordination. With these inhaler devices also problems with use were observed.(28)

Training non physician health care professionals is likely to be more effective. This includes clinical pharmacists, physician assistants and others. More generally international asthma guidelines recommend that pharmacists should form part of a team approach to patient education about use of inhalers. Pharmacy practice guidelines from the American Society of Health System Pharmacists specifically recommend that pharmacists hold and demonstrate the use of inhalers and should observe patient's medication use capability. Potential barriers to such a role for community pharmacists include business pressure, lack of clinical knowledge and time constraints. (29)

A review of medical textbooks used in the training of physicians revealed that only 2 of the 40 books included a simple list of steps to properly use a metered-dose inhaler. With so much complex information to include in a general medical text, it appears that instructions for a "simple" device do not merit valuable space in textbooks, or even time in the lecture hall. This would seem to correlate to reports that a large proportion of practicing and house physicians are incapable of demonstrating proper use of these "simple" devices.(30,31)

Conclusion

Good Knowledge and technical skills of medical personnel is vital as we have to teach patients to use MDI correctly for maximum benefit. This study observed that medical person lack the knowledge and ability to use a MDI device. This is possibly due to inadequate training in medical school or workshops after graduation and during post graduation. Training sessions or workshops are recommended to improve this. Along with this proper counseling skill is also of utmost importance.

References

1. Global Initiative for Asthma. Global Burden of Asthma. <http://www.ginasthma.com>. Accessed March 8, 2005.
2. National Asthma Education Program. Guidelines for the diagnosis and management of asthma. and Human Services, August 1991, DHHS publication 91-3042Bethesda, Md: Dept of Health.
3. Chapman KR, Bowie DM, Goldstein RS, et al. Canadian Thoracic Society Workshop Group: guidelines for the assessment and management of chronic obstructive pulmonary disease. *Can Med Assoc J* 1992; 147:420-28
4. Tinkelman DG, Berkowitz RB, Cole WQ. Aerosols in the treatment of asthma. *J Asthma* 1991; 28:243-49.
5. Dulfano MJ, Glass P. The bronchodilator effects of terbutaline: route of administration and patterns of response. *Ann Allergy* 1976;37(5): 357-366.
6. Grimwood K, Johnson-Barrett JJ, Taylor B. Salbutamol: tablets, inhalational powder, or nebuliser? *Br Med J (Clin Res Ed)* 1981; 282(6258):105-106.
7. Changes in Inhaler Devices for Asthma And COPD - Health - RedOrbit, Skrepnek & Skrepnek, 2004.
8. Newman SP. Aerosol deposition considerations in inhalation therapy. *Chest* 1985; 88:152S-160S
9. Di Benedetto C, Clarke SW. Inhalation therapy in asthma. *J R Society Med* 1992; 339:814
10. Human B. Aerosol deposition and delivery of therapeutic aerosols. *J Asthma* 1991; 28:239-42
11. Lindgren S, Bake B, Larsson S. Clinical consequences of inadequate inhalation technique in asthma therapy. *Eur J Respir Dis* 1987; 70:93-8
12. Saunders KB. Misuse of inhaled bronchodilator agents. *BMJ* 1965; 1:1037-38
13. Allen SC, Prior A. What determines whether an elderly patient can use a metered dose inhaler correctly? *Br J Dis Chest* 1986; 8:45-9
14. Epstein SW, Manning CPR, Ashley MJ, Corey PN. Survey of the clinical use of pressurized aerosol inhalers. *Can Med Assoc I* 1979; 120:813-16
15. Shim C, Williams MH Jr. The adequacy of inhalation of aerosol from canister nebulizers. *Am J Med* 1980; 69:891-94
16. Crompton GK. Problems patients have using pressurized aerosol inhalers. *Eur J Respir Dis* 1982; 63(suppl 119):101-04
17. King D, Earnshaw SM, Delaney JC. Pressurized aerosol inhalers: the cost of misuse. *Brit J Gen Prac* 1991;45(1):48-49.
18. Newman SP. Aerosol physiology, deposition and metered dose inhalers. *Allergy Proc* 1991;12(1):41-45.
19. Self TH, Rumback MJ, Kelso TM. Correct use of metered-dose inhalers and spacer devices. *Postgrad Med* 1992; 92:95-106
20. Newman SP, Clarke SW. The proper use of metered-dose inhalers. *Chest* 1984; 86:342-43
21. Kelling JS, Strohl KP, Smith RL, Altose MD. Physician knowledge in the use of canister nebulizers. *Chest* 1983; 83:612-14
22. Self TH, Brooks JB, Lieberman P, Ryan MR. The value of demonstration and role of the pharmacist in teaching the correct use of pressurized bronchodilators. *Can Med Assoc J* 1983; 128:129-31
23. Guidry GG, Brown WD, Stogner SW, George RB. Incorrect use of metered dose inhalers by medical personnel. *Chest* 1992; 101:31-3
24. Interiano B, Guntupalli KK. Metered dose inhalers: do health care providers know what to teach? *Arch Intern Med* 1993; 153:81-5

(continued page 21)

The use of CRP as an early predictor of sepsis in infants and children

Kefah Alqa'qa' MD,
Aghadeer Alhadidi MD,
Mahdi Farah MD

Pediatric and Neonatology Department,
King Hussein Medical Center.
Amman,
Jordan

Correspondence: Dr. Kefah Alqa'qa'
Email : kifah88@yahoo.com

Introduction

Infection is the body's response to invasion of any microorganism including bacterial, fungal, protozoan and viral agents that cause clinical signs of infection.(1)

Infants and children who present with clinical signs of infection are evaluated with a variety of diagnostic tests commonly referred to as septic work up after which treatment with broad spectrum antibiotics is usually initiated, until the definitive diagnosis can be made.

Isolation of microorganisms from blood culture is the golden standard for the diagnosis of sepsis but this usually takes 48-72 hours to give a result and this raised the need for other tests to provide information as to if the patient could have sepsis.

One of these tests is CRP, which is an acute phase reactant that is released in response to infectious and non infectious cases. It is one of the pentraxin family of proteins that is synthesized in liver, and is composed of six identical 23-KDa polypeptide sub-units arranged in a cyclic pentamer shape.(2,3,4,5)

Each of these subunits contains one binding site for phosphocholine and two binding sites for calcium. Each binding site has the ability to bind to a variety of substances such as components of damaged cell walls and nuclear antigens resulting in the formation of CRP ligand complexes which can activate the complement system and can bind directly to neutrophils and macrophages stimulating inflammatory release of cytokines. (6)

CRP usually begins to rise within 4-6 hours of the onset of signs and symptoms of infection or tissue injury and rapidly disappears as the infection of inflammatory process resolves.(7,8,9)

The timing of CRP measurement is critical to achieve the highest

ABSTRACT

Objective: To emphasize the role of CRP as an early predictor of sepsis in neonates and children who present with symptoms and signs of sepsis.

Methods: A retrospective study was conducted at the pediatric ward in King Hussein Medical Center during the period from January to December 2009.

The medical records of patients with positive blood cultures were reviewed and the results of blood cultures as well as the CRP readings upon admission were recorded.

Patients whose CRP result was reported as positive or negative without a definite number were excluded from the study regardless of the result of their blood cultures.

Results: A total number of 150 medical records of patients who were admitted to the paediatric and neonatal ward at King Hussein Medical Center were included.

The highest reading of CRP in the medical records of these patients was 384mg/l in 6 patients (4%) and these patients were noted to

have their blood cultures mostly positive for klebsiella and candida; 192mg/l in 24 patients (16%) and klebsiella was the commonest in this group, 96mg/l in 30 patients (20%), 48mg/l in 34 patients (22.7%), 24mg/l in 28 patients (18.7%), 12mg/l in 11 patients (7.3%) and 6mg/l in 11 patients (7.3%) and it was negative in 6 patients (4%). (Table 1).

The most common microorganism found was klebsiella in 52 patients (35%) and mostly these patients were among the neonatal age group; candida was found in 21 patients (14%), pseudomonas and enterobacter species 15 for each (10%), strep viridians 12 (8%), strep pneumonia 9(6%), staph aureus and acintobacter 6 (4%), E. coli 5 (3.5%), enterococcus 2 (1.5%), others 15 (10%).

Conclusion: Although blood culture remains the gold standard for diagnosing sepsis, measurement of CRP level at the time of presentation with symptoms and signs of sepsis can be an early predictor of sepsis.

Keywords: CRP, sepsis

sensitivity and false negative results may be obtained in preterm infants with sepsis possibly due to immature liver function.(10,11,12)

This study was conducted to emphasize the role of CRP as an early predictor of sepsis in neonates and children who present with symptoms and signs of sepsis.

Methods

A retrospective study was conducted in the pediatric department at King Hussein Medical Center during the period from January to December 2009.

The medical records of patients with positive blood cultures were reviewed and the results of blood cultures as well as the CRP readings upon admission were recorded.

Patients whose CRP readings were reported as positive only, without an exact number, were excluded from our study.

Results

A total number of 150 medical records of patients who were admitted to the paediatric and neonatal ward at King Hussein Medical Center were included.

The highest reading of CRP in the medical reports of these patients was 384mg/l in 6 patients (4%) and these patient were noted to have their blood cultures mostly positive for klebsiella and candida; 192mg/l in 24 patients (16%) and also klebsiella was the commonest in this group,

96mg/l in 30 patients (20%), 48mg/l in 34 patients (22.7%), 24mg/l in 28 patients (18.7%), 12mg/l in 11 patients (7.3%) and 6mg/l in 11 patients (7.3%) and it was negative in 6 patients (4%). (Table 1).

The most common microorganism found was klebsiella in 52 patients (35%) and mostly these patients were among the neonatal age group; candida was found in 21patients (14%), pseudomonas and enterobacter species 15 for each (10%), strep viridians in 12 (8%), strep pneumonia in 9 (6%), staph aureus and acintobacter in 6 (4%), E. coli in 5 (3.5%), enterococcus in 2 (1.5%), others 15 (10%).

Discussion

Sepsis is a leading cause of death in infants and children despite the use of modern antibiotics and resuscitation methods.(13) The systemic inflammatory response to infection involves the release of several mediators which has suggested the use of some of them as markers of sepsis severity.(14) Among these acute phase proteins is the CRP which is a component of the innate immune system that binds phosphocholine and recognizes foreign pathogens as well as phospholipid constituents of damaged cells causing adhesion and chemotaxis of phagocytic cells and lymphocytes.(15,16)

CRP is commonly used as a marker of acute inflammation. It is produced in liver in response to infection or tissue injury.(17) Its plasma

concentration has been reported to parallel the clinical course of infection and the fall of the protein level indicates the resolution of infection.(18)

Since CRP is the only acute phase reactant measured in our hospital our study was conducted to emphasize its role as an early predictor of sepsis in infants and children.

Our study revealed significantly high readings of CRP in infants and children with positive blood cultures and this is comparable to other studies who used this marker as an early predictor of sepsis and they found higher levels of this marker with severe sepsis.(19) Although some of the readings in our study were low, and even negative in a minority in comparison with the result of blood culture, this may be explained by early extraction of blood samples and unfortunately we couldn't find second readings for CRP in the medical records of these patients, which is recommended by many authors who found it better to use serial CRP readings to confirm sepsis and to follow up the response to treatment (2,21,22) and this was the limitation in our study.

Conclusion

Although blood culture remains the gold standard for diagnosing sepsis the measurement of CRP level at the time of presentation with symptoms and signs of sepsis can be an early predictor of sepsis, although serial readings thereafter may be more important.

| CRP level in mg/l | 384 | 192 | 96 | 48 | 24 | 12 | 6 | Negative |
|--------------------|-----|-----|-----|-------|-------|------|------|----------|
| Number of patients | 6 | 24 | 30 | 34 | 28 | 11 | 11 | 6 |
| Percentage% | 4% | 16% | 20% | 22.7% | 18.7% | 7.3% | 7.3% | 4% |

Table 1 CRP results

References

1. Lott J, Kenner C, Polak J. general evaluation of suspected infection. Jni Lott J ed. Neonatal infection; Assessment Diagnosis and Management. Petaluma, CA: NICU ink book; 1997:23-35.
 2. Pepys M C - reactive protein fifty years on. *Lancet*. 1981;1:653-657.
 3. Duclos T. functions of C reactive protein. *Ahn Med*. 2000; 32:274-278.
 4. Ballou S, Kushner I. C reactive protein and the acute phase response. *Adv intern Med*. 1992;37:313-336.
 5. Kushner I. C reactive protein and acute phase response. *Hosp Prach*. 1990;25:13-28.
 6. Gabay C, Kushner I. Mechanisms of disease: acute-phase proteins and other systemic responses to inflammation. *N Engl J Med*. 1999;448-454.
 7. Cehl S, Gering B, Bartmann P, Haged J, Pohland F. C reactive protein is a useful marker for duration of antibiotic therapy in suspected bacterial infection. *Pediatrics*. 1997;99:216-221.
 8. Kawamura M, Nishida H. the usefulness of serial C reactive protein measurements in managing neonatal infection. *Acta Pediatr*. 1995;84:10-13.
 9. Berger C, Uehinger J, Ghelfi D, Blau N, Fanconi S. comparison of C reactive protein and white blood cell count with differential in neonates at risk of septicemia. *Eur Pediatr*. 1995;154:138-144.
 10. Bomed H, Ballot D, Cory B, Cooper P. use of C reactive protein to guide duration of empiric antibiotic therapy in suspected early neonatal sepsis. *Pediatr infect dis J*. 200;19:531-535.
 11. Posen R, Delemos R. C reactive protein levels in the extremely premature infant: case studies and literature review. *J perinatol*. 1998;18:138-141.
 12. Wagles, Grauaug A, Kohan R, Evans S. C reactive protein as a diagnostic tool of sepsis in very premature babies. *J pediatr child health*. 1994;30:40-44.
 13. Angus DC, Linde-Zwirble WT, Lidicker J et al. Epidemiology of sever sepsis in the United States: analysis of incidence, outcome and associated costs of care. *Crit Care Med* 2001,29:1303-1310.
 14. Enguix A, Rey C, Concha A, Medina A, Coto D, Diéguez MA. Comparison of procalcitonin with C-reactive protein and serum amyloid for the early diagnosis of bacterial sepsis in critically ill neonates and children. *Intensive Care Med*. 2001 Jan;27(1):211-5
 15. Patel H, Fellowes R, Coade S, Woo P. Human serum amyloid A has cytokine-like properties. *Scand J Immunol*. 1998 Oct;48(4):410-8.
 16. Gabay C, Kushner I. Acute-Phase Proteins and Other Systemic Responses to Inflammation. *N Engl J Med* 1999; 340:448-454 February 11, 1999.
 17. Ugarte H, Silva E, Mercan D, De Mendonça A, Vincent JL. Procalcitonin used as a marker of infection in the intensive care unit. *Crit Care Med*. 1999 Mar;27(3):4.
 18. Arnon S, Litmanovitz I, Regev R, Lis M, Shainkin-Kestenbaum R, Dolf. Serum amyloid A protein in the early detection of late-onset bacterial sepsis in preterm infants. *J Perinat Med*. 2002;30(4):329-32.
 19. Matson A, Soni N, Sheldon J. C-reactive protein as a diagnostic test of sepsis in the critically ill. *Anaesth Intensive Care*. 1991 May;19(2):182-6
 20. Suri M, Trirupuram S, Sharma VK. Diagnostic and prognostic utility of C reactive protien, alpha-1-antitrypsin and alpha -2-macroglobulin in neonatal sepsis: a comparative account. *Indian pediatrics*, 1991,28:1159-64.
 21. Krediet T et al. The predictive value of CRP and I/T ratio in neonatal infection. *Journal of perinatal medicine*, 1992,20:479-85.
 22. Anwer SK, Mustafa S. Rapid identification of neonatal sepsis. *Journal of the Pakistan Medical Association*, 2000,50:94-8.
- (References continued from *Medical personnel's knowledge and technical skills in using a metered dose inhaler* page 18)
25. Self TH, Kelso TM, Arheart KL, et al. Nurses' performance of inhalation technique with metered dose inhaler plus spacer device. *Ann Pharmacother* 1993; 27:185-87
 26. Melani AS, Zanchetta D, Barbato N, Sestini P, Cinti C, Canessa PA, et al. Associazione Italiana Pneumologi Ospedalieri Educational Group. Inhalation technique and variables associated with misuse of conventional metered-dose inhalers and newer dry powder inhalers in experienced adults. *Ann Allergy Asthma Immunol* 2004;93(5): 439-446.
 27. Interiano B, Guntupalli KK. Metered-dose inhalers. Do health care providers know what to teach? *Arch Intern Med* 1993;153(1):81-85.
 28. Schultz RK. Drug delivery characteristics of metered-dose inhalers. *J Allergy Clin Immunol* 1995;96(2):284-287.
 29. Kesten S, Zive K, Chapman KR. Pharmacist knowledge and ability to use inhaled medication delivery systems. *Chest* 1993;104(6):1737-1742.
 30. Hanania NA, Wittman R, Kesten S, Chapman KR. Medical personnel's knowledge of and ability to use inhaling devices: metered-dose inhalers, spacing chambers and breath-actuated dry powder inhalers. *Chest* 1994;105(1):111-116.
 31. Lee-Wong M, Mayo PH. Results of a programme to improve house staff use of metered dose inhalers and spacers. *Postgrad Med J* 2003;79(930):221-225.

Tuberculosis in Iraq: a Post-Invasion Survey of Knowledge, Attitude and Practice in the Anbar Governorate

Thamer Kadum Yousif, (1)
 Ross I. Donaldson, (2)
 Sevil Husseynova (3)

(1) Al Kindy College of Medicine/Ministry of Higher Education, Baghdad, Iraq,
 (2) International Medical Corps, Baghdad, Iraq†; the Department of Emergency Medicine, Harbor-UCLA Medical Center, David Geffen School of Medicine at UCLA, Los Angeles, CA
 (3) WHO/EMRO /TB (project manager)

Correspondence:

Prof.Thamer Kadum Yousif,
 Al Kindy College of Medicine/Ministry of Higher Education, Baghdad, Iraq
Email: thamer_sindibaad@yahoo.com

ABSTRACT

This community-based cluster study aimed to explore tuberculosis (TB) attitudes, knowledge and practices in Anbar Governorate, Iraq, as well as to compare these attributes with a subset of the population with good TB knowledge. Completed surveys were obtained from 692 subjects. 10.6% of these met study criteria for having good knowledge of TB. They were more frequent health care seekers ($p<0.001$), although also more likely to be dissatisfied with the availability of medicine and equipment at those health clinics ($p<0.001$). Higher percentages in this Good-Knowledge subgroup felt that TB affected relationships with friends ($p<0.001$), family ($p=0.039$) and work performance ($p=0.036$). Community members from a wide-range of socioeconomic and educational levels require information about TB.

Introduction

Although the Iraq Ministry of Health has recognized TB control as a top priority since 1998 [1], the country continues to have one of the highest TB rates in the region (56/100,000 in 2006) [2]. To address this widespread issue, the Iraqi National TB Program (NTP) implemented Directly Observed Treatment Short-course (DOTS) in all 15 of Iraq's southern governorates in 2000 [2]. Unfortunately, beginning in 2003, war and sectarian violence disrupted the provision of TB health services throughout the country [3]. However, the NTP is now in the process of restoring itself, including the rebuilding of TB laboratories, restarting of DOTS, retraining of health workers, and redevelopment of surveillance systems.

Increasing the TB case detection rate is a necessary key to disease reduction [4]. However, the TB case detection rate in Iraq continues to lag behind the WHO target of >70%, at only 47% (40% for sputum-positive cases) [1,5]. Population outreach is known to raise case detection rates by encouraging infected individuals to seek treatment [5,6,7]. Ensuring that this outreach is targeted to the

appropriate demographics leads to the most effective efforts [8]. The assessment of a population's current knowledge, attitudes, and practices to TB provides a basis for developing such an informed outreach program [9,10].

Although there was limited local TB research in Iraq prior to the 2003 invasion [11,12,13,14] conflict-associated challenges have now confounded understanding of the disease within the country. One recent study provides data about knowledge, attitude, and practice in Baghdad [15]. However, to date, there has been no available research on the geographically vast landmass of the Anbar Governorate (including the cities of Ramadi and Fallujah), an area with historically high TB rates and some of the worst violence during the recent conflict. This study provides that essential information, as a first step in rebuilding Iraq's post-conflict TB surveillance and care systems.

Subject and Methods

Sample

We conducted this survey in Iraq's Anbar Governorate, located in the western portion of the country and representing 32% of Iraq's total surface area. Estimates from the Iraqi Central Statistical System, for the seven sampled districts within Anbar Governorate, gave a total population under study of 1.5 million. Within the Anbar governorate, we calculated the sample size needed to evaluate the TB survey question items, with a power of 80% and a 95% confidence level, to be 692 respondents.

Data Collection

We carried out this community-based cluster study in October 2008, within the seven main sectors of the Anbar Governorate (Ramadi, Fallujah, Fares, Arabi, Heet, Hadeetha, and Qaem). At the first stage of sampling, investigators, all Iraqi paramedical staff with previous community medical experience and two days of training for this study, listed districts units within the Anbar governorate by population. They then selected seven units at random and proceeded to find the largest building (e.g. school, market, or Mosque) within each unit.

Investigators then numbered the surrounding houses in a clockwise direction, before randomly selecting a start household. They then proceeded to the adjacent residences, passing over empty houses or those households that refused to participate, until investigators interviewed 94 households in all locations. After receiving informed verbal consent, the teams directly interviewed one subject per household (defined as a unit that ate together, and had a separate entrance from the street or a separate apartment entrance) via a pre-tested, written questionnaire. The interviewers had the responsibility and authority to change to an alternate location, if they perceived the level of insecurity or risk to be unacceptable. Guidelines precluded the interviewers from doing callbacks during nighttime, due to the security situation.

This study received prior ethical approval from the Tuberculosis Steering Committee of the Anbar governorate and the Iraqi Ministry of Health. It additionally received ethical approval for subsequent data analysis from the Los Angeles Biomedical Institute.

Statistical Analysis

After data blinding, we performed data entry and statistical analysis with SPSS version 12.0 (SPSS Inc., Chicago, Illinois), including a descriptive analysis of the full dataset. We then performed subgroup analyses using the Chi-squared test to compare overall participants to participants with Good-Knowledge of TB. We used a 5% significance level as the cutoff for determining statistical significance. All tests were 2-sided.

Results

Good-Knowledge Subgroup

Of the total sample of 662 respondents to this survey, 70 (10.6%) had "Good-Knowledge" of TB. We defined Good-Knowledge as a respondent indicating on the survey both that he/she had heard of TB and could correctly identify all of the following: airborne route as way for contracting TB; covering mouth and nose, as way of preventing TB; and, all people, as a group at risk for getting TB. We excluded respondents who answered any one of these questions incorrectly from the Good-Knowledge sub-group.

Sociodemographic Criteria

In the total sample, 492 (73.1%) respondents were male and 181 (27%) were female (see Table 1). In the Good-Knowledge sub-group, 50 (71.4%) were male and 20 (28.6%) were female (No Significance). The mean age of respondents was 30 10 years, ranging from 15 to 72 years. In the Good-Knowledge group, 55.7% of respondents had attained higher than a secondary school level of education, compared to just 32.1% of the total sample ($p < 0.001$). Interestingly, income was not associated with Good-Knowledge.

Knowledge

The majority (89.3%) of respondents indicated that they had heard of TB (Table 2), although the source of information about TB was not statistically associated with Good-Knowledge. When asked about the seriousness of TB in general, 98.6% of respondents with Good-Knowledge identified TB as a serious disease while only 77% of the total sample saw it as a serious ($p < 0.001$). Similarly, 81.4% of the Good-Knowledge group identified TB as a serious problem in Iraq as compared to 60% of the total sample ($p < 0.001$).

Practice

Those with Good-Knowledge were more likely to have visited a hospital twice in the last year, when compared to the total sample ($p < 0.001$) (Table 3). Of those in the Good-Knowledge subgroup, 84.3% reported that they had talked to a doctor or other medical worker about TB, while only 57.6% of the total sample had spoken to a health professional ($p < 0.001$).

Additionally, knowledge and perceptions of TB services were higher in the Good-Knowledge subgroup, which was more likely to be satisfied with public ($p = 0.002$) and private ($p < 0.001$) services. Similarly, 77.1% of respondents with Good-Knowledge perceived the Chest Disease Facility (CDF) or Primary Health Center (PHC) services to be good or excellent, compared to only 58.8% of respondents in the total sample ($p = 0.002$). Likewise, 80.0% of respondents with Good-Knowledge reported that they found doctor behavior at CDF/PHCs to be good or excellent, compared to only 53.7% of the total sample ($p < 0.001$).

Interestingly, the Good-Knowledge subgroup was actually more likely than the total sample to believe that the CDFs/PHCs in their area were poorly equipped (47.14% of the Good-Knowledge subgroup compared to 25.3% of the total sample) ($p < 0.001$). Additionally, 43.48% of the Good-Knowledge subgroup believed that CDF/PHCs had adequate medication available, compared with 25.6% of the total sample ($p < 0.001$).

| Population Characteristics | Total Sample | | Good-Knowledge | | Significance |
|---|--------------|------|----------------|------|----------------------------|
| | No. | (%) | No. | (%) | |
| Age (Years) | | | | | |
| 15–19 | 109 | 16.1 | 8 | 11.4 | Not Significant |
| 20–29 | 261 | 38.6 | 25 | 35.7 | |
| 30–39 | 169 | 25.0 | 20 | 28.6 | |
| 40–49 | 134 | 19.8 | 16 | 22.9 | |
| 50–59 | 2 | 0.3 | 1 | 1.4 | |
| 60–69 | 0 | 0.0 | 0 | 0.0 | |
| 70+ | 1 | 0.1 | 0 | 0.0 | |
| Sex | | | | | |
| Female | 181 | 27.0 | 20 | 28.6 | Not Significant |
| Male | 492 | 73.1 | 50 | 71.4 | |
| Education | | | | | |
| Illiterate | 113 | 16.8 | 7 | 10.0 | Significant $p < 0.001$ |
| No formal education but can read and write | 90 | 13.4 | 5 | 7.1 | |
| Primary education | 116 | 17.2 | 14 | 20.0 | |
| Secondary | 139 | 20.6 | 5 | 7.1 | |
| Tertiary/higher | 114 | 16.9 | 19 | 27.1 | |
| Occupational | 78 | 11.6 | 12 | 17.1 | |
| Other | 24 | 3.6 | 8 | 11.4 | |
| Residence | | | | | |
| Rural | 283 | 42.4 | 26 | 37.7 | Not Significant |
| Urban | 384 | 57.6 | 43 | 62.3 | |
| Family Monthly Income | | | | | |
| <\$300 | 143 | 36.0 | 11 | 25.0 | Not Significant |
| \$300 to <\$500 | 164 | 38.6 | 22 | 50.0 | |
| \$500 to \$1000 | 87 | 20.5 | 8 | 18.2 | |
| >\$1000 | 21 | 4.9 | 3 | 6.8 | |

Table 1: Sociodemographic Data of All Subjects Compared to Those with Good-Knowledge

Attitudes

Respondents in the total sample were more likely to say that would want to hide a case of TB, as compared to respondents with Good-Knowledge ($p=0.013$) (see Table 4). The total sample was also more likely to say they would prefer to live in isolation if they had TB (31% vs. 17% respectively) ($p<0.001$). For

the Good-Knowledge respondents, 82.61% believed TB affects work performance, while just 69.2% of the total sample believed similarly ($p=0.036$).

The majority of respondents in both the Good-Knowledge subgroup (76.81%) and the total sample (68.90%) believed that TB

affects relations with others (Not Significant). Of the Good-Knowledge respondents, 80.9% believed that TB affected relationships with friends and others, compared with 59.55% of the total sample ($p<0.001$). Similarly, 82.1% of respondents with Good-Knowledge believed that a person's chances of getting married are reduced due to a TB diagnosis,

| Item | Total Sample | | Good-Knowledge | | Significance | |
|---|--------------|------|----------------|-------|-----------------|--|
| | No. | (%) | No. | (%) | | |
| Heard About TB | | | | | | |
| Yes | 72 | 10.7 | 70 | 100.0 | | |
| No | 602 | 89.3 | 0 | 0.0 | | |
| Source of information about TB | | | | | | |
| TV | 342 | 55.2 | 38 | 54.3 | | |
| Radio | 16 | 2.6 | 0 | 0.0 | | |
| Billboards | 6 | 1.0 | 1 | 1.4 | | |
| Newspaper/Magazine | 27 | 4.4 | 5 | 7.1 | | |
| Doctor | 71 | 11.5 | 14 | 20.0 | Not Significant | |
| Pharmacy | 6 | 1.0 | 1 | 1.4 | | |
| Religious Leaders | 3 | 0.5 | 0 | 0.0 | | |
| Friends/Relative | 89 | 14.4 | 9 | 12.9 | | |
| Others | 13 | 2.1 | 1 | 1.4 | | |
| Teachers | 47 | 7.6 | 1 | 1.4 | | |
| Thoughts about TB seriousness | | | | | | |
| Very serious | 319 | 47.3 | 50 | 71.4 | | |
| Somewhat serious | 202 | 30.0 | 19 | 27.1 | | |
| Not very serious | 50 | 7.4 | 1 | 1.4 | | |
| Don't know | 103 | 15.3 | 0 | 0.0 | | |
| Possible Modes of TB Transmission | | | | | | |
| Handshaking | 130 | 19.5 | 0 | 0.0 | | |
| Eating in same dishes | 163 | 24.4 | 0 | 0.0 | | |
| Air, when TB patient coughs or sneezes | 199 | 29.8 | 70 | 100.0 | | |
| Sharing sheesha pipe | 26 | 3.9 | 0 | 0.0 | | |
| Smoking | 75 | 11.2 | 0 | 0.0 | | |
| Touching items in public places | 11 | 1.6 | 0 | 0.0 | | |
| Others (Blood) | 1 | 0.1 | 0 | 0.0 | | |
| Don't Know | 62 | 9.3 | 0 | 0.0 | | |
| Possible Modes of Preventing TB | | | | | | |
| Avoid shaking hands | 134 | 19.9 | 0 | 0.0 | | |
| Covering mouth and nose when coughing or sneezing | 245 | 36.4 | 70 | 100.0 | | |
| Avoid sharing dishes | 105 | 15.6 | 0 | 0.0 | | |

(Continued next page)

| | | | | |
|---|-----|------|----|-------|
| Washing hands after touching items in public places | 54 | 8.0 | 0 | 0.0 |
| Closing window at home | 31 | 4.6 | 0 | 0.0 |
| Good nutrition | 23 | 3.4 | 0 | 0.0 |
| Other | 7 | 1.0 | 0 | 0.0 |
| Don't know | 74 | 11.0 | 0 | 0.0 |
| Persons at Risk for Getting TB | | | | |
| Anybody | 265 | 39.4 | 70 | 100.0 |
| Only poor people | 236 | 35.1 | 0 | 0.0 |
| Only homeless people | 40 | 5.9 | 0 | 0.0 |
| Only alcoholics | 13 | 1.9 | 0 | 0.0 |
| Only drug users | 11 | 1.6 | 0 | 0.0 |
| Only people with HIV/AIDS | 18 | 2.7 | 0 | 0.0 |
| Only people in prison | 26 | 3.9 | 0 | 0.0 |
| Don't know | 62 | 9.2 | 0 | 0.0 |

Table 2: Knowledge of TB: All Subjects Compared to Those with Good-Knowledge

compared with 63.16% of the total sample ($p=0.003$). Only about half of each group believed that TB affects a marital relationship already established (Not Significant).

Discussion

This study provides much-needed information about TB knowledge, attitude, and practice among residents in post-invasion Iraq, specifically in the conflict-stricken Anbar governorate. Of our respondents, the vast majority lacked even basic TB knowledge, with only 10.6% having heard of TB and able to correctly answer three simple questions about the disease's spread, prevention, and transmission. Although the NTP has made efforts to provide tuberculosis education across Iraq, the recent conflict has limited its ability to intervene. The results of this survey indicate that there is a definite need to increase TB education in the Anbar Governorate (a finding similar to several other recent KAP studies conducted in Morocco [], Delhi [] and Vietnam [11]). Data from this survey provides useful clues for targeting such future education. Although limited by a higher male response rate (a culturally typical finding), there was no statistically

significant association between good TB knowledge and age, gender, residence, or income. As such, TB outreach programs in the area need to be wide reaching and span multiple demographics.

This study did find that education levels were associated with Good-Knowledge (consistent with past studies in Serbia [] and Manila []). However, overall, people at all educational levels displayed poor knowledge of TB. Therefore, any TB interventions within the Anbar population will need to be accessible to a wide range of educational levels. Past studies have suggested integrating TB education into elementary school curricula as a potential solution [19]. Using wide reaching media sources (e.g. commercials during popular television shows) is another potential solution. Although Good-Knowledge was not influenced by the source of information about tuberculosis, our finding that television was by far the most reported resource for TB education further supports such an approach.

Respondents in the Good-Knowledge subgroup were more likely to have seen a doctor twice in the last year. However, the direction

of this relationship is open to speculation. Persons with good TB knowledge may seek more care because they have better general health knowledge. Alternatively, more frequent health care seekers may learn more about TB from their increased contact with health professionals. In either case, this survey clearly demonstrates that outreach programs in the area must extend beyond healthcare facilities, if they are to reach those with the poorest understanding of TB.

Interestingly, compared to the overall sample, the Good-Knowledge subgroup was simultaneously more likely to seek care and to believe their local health facilities were ill-equipped. This may reflect a greater knowledge of the actual conditions in the local health facilities, and highlights the importance of accompanying TB outreach campaigns with improvements in clinical TB care. Increased demand for TB screening following the completion of an educational campaign can be short-lived [6], a problem which can be exacerbated by inadequate or unavailable services.

| Item | Total Sample | | Good-Knowledge | | Significance |
|---|--------------|------|----------------|------|--------------------------|
| | No. | (%) | No. | (%) | |
| Number of Times Clinic or Hospital Visited | | | | | |
| Twice a year | 251 | 37.1 | 43 | 61.4 | Significant p < 0.001 |
| Once a year | 144 | 21.3 | 6 | 8.6 | |
| Less than a year but twice in the past | 97 | 14.3 | 10 | 14.3 | |
| Once in the past 5 years | 71 | 10.5 | 3 | 4.3 | |
| Not in the past year | 114 | 16.8 | 8 | 11.4 | |
| | | | | | |
| Who You Talk About TB With | | | | | |
| Doctor or other medical workers | 390 | 57.6 | 59 | 84.3 | Significant p < 0.001 |
| Pharmacy | 33 | 4.9 | 0 | 0.0 | |
| Spouse | 28 | 4.1 | 0 | 0.0 | |
| Parent | 30 | 4.4 | 3 | 4.3 | |
| Child(ren) | 1 | 0.1 | 1 | 1.4 | |
| Other family member | 136 | 20.1 | 4 | 5.7 | |
| Close friend | 41 | 6.1 | 2 | 2.9 | |
| No one | 18 | 2.7 | 1 | 1.4 | |
| Place Attended if TB Suspected | | | | | |
| Government hospital | 530 | 78.5 | 56 | 80.0 | Not significant |
| Private clinic | 118 | 17.5 | 13 | 18.6 | |
| NGO clinic | 4 | 0.6 | 0 | 0.0 | |
| HIO | 7 | 1.0 | 0 | 0.0 | |
| Pharmacy | 8 | 1.2 | 1 | 1.4 | |
| Don't know | 8 | 1.2 | 0 | 0.0 | |
| | | | | | |
| Satisfaction with Governmental TB Services | | | | | |
| Satisfied | 417 | 62.1 | 57 | 81.4 | Significant p = 0.002 |
| Not satisfied | 146 | 21.7 | 9 | 12.9 | |
| Don't know | 109 | 16.2 | 4 | 5.7 | |
| Satisfaction with Private TB Services | | | | | |
| Satisfied | 339 | 58.7 | 53 | 82.8 | Significant p < 0.001 |
| Not satisfied | 107 | 18.5 | 6 | 9.4 | |
| Don't know | 132 | 22.8 | 5 | 7.8 | |

(continued next page)

Best Source for TB Awareness

| | | | | | |
|----------------------|-----|------|----|------|-----------------|
| TV | 405 | 59.8 | 50 | 71.4 | |
| Radio | 50 | 7.4 | 1 | 1.4 | |
| Newspaper/Magazine | 50 | 7.4 | 7 | 10.0 | |
| Doctor | 95 | 14.0 | 9 | 12.9 | |
| Friends | 22 | 3.2 | 1 | 1.4 | Not Significant |
| Relative | 11 | 1.6 | 1 | 1.4 | |
| Medical store | 1 | 0.1 | 0 | 0.0 | |
| Information booklets | 2 | 0.3 | 0 | 0.0 | |
| Pharmacy | 4 | 0.6 | 0 | 0.0 | |
| Don't know | 37 | 5.5 | 1 | 1.4 | |

Perceptions of CDF or PHC Services

| | | | | | |
|------------|-----|------|----|------|--------------------------|
| Excellent | 59 | 9.0 | 4 | 5.7 | Significant p = 0.002 |
| Good | 325 | 49.8 | 50 | 71.4 | |
| Poor | 129 | 19.8 | 8 | 11.4 | |
| Don't know | 140 | 21.4 | 8 | 11.4 | |

Perception of Doctor Behavior at CDF or PHC

| | | | | | |
|------------|-----|------|----|------|--------------------------|
| Excellent | 46 | 7.0 | 3 | 4.3 | Significant p < 0.001 |
| Good | 306 | 46.7 | 53 | 75.7 | |
| Poor | 144 | 22.0 | 8 | 11.4 | |
| Don't know | 159 | 24.3 | 6 | 8.6 | |

CDF or PHC is Well-Equipped

| | | | | | |
|------------|-----|------|----|------|--------------------------|
| Yes | 214 | 33.2 | 24 | 34.3 | Significant p < 0.001 |
| No | 163 | 25.3 | 33 | 47.1 | |
| Don't know | 267 | 41.5 | 13 | 18.6 | |

Medication Available at CDF or PHC

| | | | | | |
|------------|-----|------|----|------|--------------------------|
| Yes | 276 | 42.8 | 29 | 42.0 | Significant p < 0.001 |
| No | 165 | 25.6 | 30 | 43.5 | |
| Don't know | 204 | 31.6 | 10 | 14.5 | |

Table 3: Practices Related to TB: All Subjects as Compared to Those with Good TB Knowledge Scores

Because the respondents with Good-Knowledge were more likely to have an understanding of the seriousness of TB, it is not surprising that they were more likely to believe that the disease impacts a person's work performance and interpersonal relationships. Any future outreach campaigns should strive to convey the seriousness of TB and importance of seeking treatment,

including its potential impact on daily activities, while not promoting stigmatized views of TB [].

The recent conflict in Iraq has disrupted the provision of many health services, including those of TB treatment and control. Now, as Iraq reinstates many of these public programs, the country has an opportunity to increase its TB

control efforts. This survey provides data necessary to understand the current knowledge, attitudes, and practice of the Iraqi people in one of the areas hardest hit by violence. With that understanding, authorities may appropriately design targeted improvements in TB education and continue to improve services for the at-risk populace.

| Item | Total Sample | | Good-Knowledge | | Significance |
|---|--------------|------|----------------|------|--------------------------|
| | No. | (%) | No. | (%) | |
| Would you be ashamed of having TB? | | | | | |
| Yes | 367 | 54.6 | 39 | 57.4 | Not Significant |
| No | 244 | 36.3 | 27 | 39.7 | |
| Don't know | 61 | 9.1 | 2 | 2.9 | |
| Would you want to hide that you had TB? | | | | | |
| Yes | 367 | 54.7 | 29 | 42.0 | Significant p = 0.013 |
| No | 273 | 40.7 | 39 | 56.5 | |
| Don't know | 31 | 4.6 | 1 | 1.5 | |
| Does TB affect relationships with others? | | | | | |
| Yes | 464 | 68.9 | 53 | 76.8 | Not Significant |
| No | 153 | 22.7 | 13 | 18.8 | |
| Don't know | 56 | 8.3 | 3 | 4.4 | |
| Would you prefer to live in isolation if you had TB? | | | | | |
| Yes | 208 | 31.0 | 12 | 17.4 | Significant p < 0.001 |
| No | 366 | 54.5 | 55 | 79.7 | |
| Don't know | 97 | 14.5 | 2 | 2.9 | |
| Does TB affect a marital relationship? | | | | | |
| Yes | 356 | 53.1 | 40 | 58.0 | Not Significant |
| No | 147 | 21.9 | 16 | 23.2 | |
| Don't know | 167 | 24.9 | 13 | 18.8 | |
| Does TB affect family responsibility? | | | | | |
| Yes | 398 | 59.7 | 46 | 57.9 | Significant P<0.039 |
| No | 146 | 21.9 | 18 | 26.1 | |
| Don't know | 123 | 18.4 | 5 | 7.2 | |
| Does TB affect relationships with friends & others? | | | | | |
| Yes | 399 | 59.6 | 55 | 80.9 | Significant P<0.001 |
| No | 118 | 17.6 | 12 | 17.7 | |
| Don't know | 152 | 22.7 | 1 | 1.5 | |
| Do you think there are less chances of getting married due to a TB diagnosis? | | | | | |
| Yes | 420 | 63.2 | 55 | 82.1 | Significant P=0.003 |
| No | 116 | 17.4 | 7 | 10.1 | |
| Don't know | 129 | 19.4 | 5 | 7.3 | |
| Do you think TB affects work performance? | | | | | |
| Yes | 460 | 69.2 | 57 | 82.6 | Significant p =0.036 |
| No | 148 | 22.3 | 8 | 11.6 | |
| Don't know | 57 | 8.6 | 4 | 5.8 | |

Table 4: Attitudes Related to TB: All Subjects vs. Those with Good TB Knowledge Score

References

1. Republic of Iraq Ministry of Health National Tuberculosis Control Program [homepage on the Internet]. Baghdad, Iraq; [cited on 2009 Aug 9]. Available from <http://www.ntpiraq.co.cc/>.
2. WHO. Global TB Control: Surveillance, Planning, Financing. Geneva: WHO, 2008.
3. Hashim D S. Tuberculosis in Iraq 2004. Inter-Country Meeting of National Tuberculosis Programme Managers in the Eastern Mediterranean Region. 26-29 April 2004. Lahore, Pakistan. Cited 9 August 2009. Available at <http://www.slideshare.net/blueash/tb-3>.
4. United Nations. The Millennium Development Goals Report 2009. New York: UN, 2009.
5. Griffiths C, Sturdy P, Brewin P et al. Educational outreach to promote screening for tuberculosis in primary care: a cluster randomized controlled trial. *Lancet* 2007, 369: 1528-1534.
6. Ahmad R A, Mahendradhata Y, Cunningham J, Utarini A, de Vlas S J. How to optimize tuberculosis case finding: explorations for Indonesia with a health system model. *BMC Infectious Diseases*. 2009, 8: 87.
7. Jaramillo E. The impact of media-based health education on tuberculosis diagnosis in Cali, Columbia. *Health Policy and Planning* 2001, 16(1): 68-73.
8. Sharma N, Nath A, Taneja D K, Ingle G K. A qualitative evaluation of the information, education, and communication component of the Tuberculosis Control Program in Delhi, India. *Asia Pacific Journal of Public Health* 2009, 21: 321-332.
9. Waisbord S. Beyond the medical-informational model: Recasting the role of communication on tuberculosis control. *Social Science and Medicine* 2007, 65: 2130-2134.
10. Hoa N P, Nguyen T K C, Thorson A. Knowledge, attitudes, and practices about tuberculosis and choice of communication channels in a rural community in Vietnam. *Health Policy* 2009, 90: 8-12.
11. Hashim DS, Al Kubaisy W, Al Dulayme A. Knowledge, attitudes and practices survey among health care workers and tuberculosis patients in Iraq. *Eastern Mediterranean Health Journal* 2003, 9(4): 718-731.
12. Al-Kubaisy W, Al-Dulaymi A, Selman HD. Active tuberculosis among Iraqi schoolchildren with positive skin tests and their household contacts. *Eastern Mediterranean Health Journal* 2003, 9(4): 675-688.
13. Niazi A D, Al-Delimi A M. Impact of community participation on treatment outcomes and compliance of DOTS patients in Iraq. *Eastern Mediterranean Health Journal* 2003, 9(4): 709-717.
14. Mohan A, Nassir H, Niazi A. Does routine home visiting improve the return rate and outcome of DOTS patients who delay treatment? *Eastern Mediterranean Health Journal* 2003, 9(4): 702-708.
15. Yousif T K, Al Khaya I M. Survey of knowledge, attitudes and practices: enhanced response to TB ACSM, Iraq. *Middle East Journal of Family Medicine* 2009, 7(1): 23-38.
16. Ottmani S, Obermeyer Z, Bencheikh N and Mahjour J. Knowledge, attitudes and beliefs about tuberculosis in urban Morocco. *Eastern Mediterranean Health Journal* 2008, 14(2): 298-304.
17. Sharma N, Malhotra R, Taneja D K, Saha R, Ingle G K. Awareness and perception about tuberculosis in the general population. *Asia Pacific Journal of Public Health* 2007, 19: 10-15.
18. Vukovic D, Nagorni-Obradovi L, Bjegovic V. Knowledge and misconceptions of tuberculosis in the general population in Serbia. *European Journal of Clinical Microbiology and Infectious Disease* 2008, 27: 761-767.
19. Portero Navio J L, Rebuio Yuste M, Pasicatan M A. Socio-economic determinants of knowledge and attitudes about tuberculosis among the general population of Metro Manila, Philippines. *International Journal of Tuberculosis and Lung Disease* 2002, 6(4): 301-306.
20. Smith R. Media Depictions of Health Topics: Challenge and Stigma Formats. *Journal of Health Communication* 2007, 12: 233-249.

Atrial Myxoma presenting as asymptomatic left atrial mass - a Case Report

Momah, Tobe (1)

Sarath, Reddy (2)

Vasantha Kondamudi (3)

(1) 3rd year Resident, Department of Family Medicine

(2) Senior Attending in the Department of Cardiology at The Brooklyn Hospital Center

(3) Vasantha Kondamudi is the Chairperson, Department of Family Medicine, The Brooklyn Hospital Center

Correspondence:

Momah Tobe MD, MSc PGY - III

Resident Department of Family Medicine, The Brooklyn Hospital Center

121 Dekalb Ave, Brooklyn, NY, 11201

Phone: 1-7182508621/6317476071

Fax: 1-718-250-6009 / 1-718-250-8878

Email: tobemomah@yahoo.com

Introduction

We present a case of asymptomatic left atrial myxoma in an African American male which was incidentally discovered on pre-operative evaluation at an advanced age. The advanced age of presentation with no attendant symptoms and the post operative complications (including Dressler's syndrome and cardiac tamponade) make this case especially significant for primary care doctors who are involved in pre-operative evaluations.

Case Presentation

A 71 year old asymptomatic male with prior history of Hypertension (HTN) and benign prostatic hypertrophy (BPH) presented for pre-operative cardiac evaluation in lieu of a planned prostate biopsy. Trans thoracic Echocardiogram (TTE) showed an incidental 4 x 2.7 cm left atrial mass (Figure 1) attached to the atrial septum and causing mitral valve inflow obstruction. The mass was surgically resected and histopathology was consistent with a diagnosis of atrial myxoma.



Patient was discharged on post-operative day three; he however re-presented eight weeks after initial surgery with shortness of breath and dyspnea on exertion. The TTE findings on re-admission were significant for cardiac tamponade and the patient underwent an emergency pericardial window. Post operative diagnosis was confirmed as Dressler's syndrome and patient treated with non steroidal anti-inflammatory drugs (NSAIDs) as an outpatient for two weeks. The patient is currently stable and in no distress.

Discussion

Cardiac myxomas are the most common primary cardiac tumors and are located in the left atrium 80-90% of the time(1). They are benign tumors with slightly increased female preponderance and an age range typically occurring between thirty and sixty years of age(2). Most cases of atrial myxoma are diagnosed incidentally by a TTE as their smooth lobulated borders have a characteristic spherical or ovoid shape on echocardiogram that makes them diagnostic(3). When symptomatic they may present with obstruction of cardiac blood flow, embolic phenomena and constitutional symptoms (such as dizziness, fainting and shortness of breath)(3).

Definitive diagnoses and treatment of atrial myxoma is by immunohistochemical and histological analysis of surgically excised masses. Extended surgical excision of the tumor including the root of the tumor is considered curative with resolution of symptoms(1). There is currently an operative mortality rate of 0% to 3% and a recurrence rate between 1% and 3% for sporadic myxomas when incompletely resected(4). It is rarely complicated (as our case was) by Dressler's syndrome and cardiac tamponade and this is the first reported case of such complications.

Other differentials for a cardiac mass in the left atrium include metastatic tumors to the left atrium (most commonly from a sarcoma(5) and a left atrial thrombi which are

the most commonly found masses, atrial myxomas, are second (6,7) in the heart. Malignant primary tumors in the left atrium are rare but are another possible differential for left atrial masses; the most common subtypes in adults are the angiosarcoma(7) and they present as a heterogeneous enhancement with multi chamber involvement and intramural spread(7).

Conclusion

Though relatively rare, asymptomatic cardiac myxoma in the elderly is an increasingly common occurrence(6) and one primary care physicians undertaking pre-operative evaluations of their patients must be aware of. This case highlights the importance of surgically evaluating a cardiac mass for definitive diagnoses and monitoring for the occurrence of rare post operative complications, like Dressler's syndrome and cardiac tamponade, in such patients.

References

1. Wang X, Mei Q, Hu D, Li D, Ji Q. A giant cyst-like mass: an unusual morphus of left atrial myxoma. *Chin Med J* 2009; 122 (2): 236-237
2. Low K, Huang J, Lim C. Clinics in diagnostic imaging. *Singapore Med J* 2009; 50 (5): 547
3. Grebenc M, Rosado-de-Christenson M, Green C, Burke A, Galvin J. Cardiac myxoma: imaging features in 83 patients. *Radiographics* 2002;22: 673-89
4. Charokopos N, Rouska E, Pliakos C, Pagourelis E, Artemiou P, Foroulis C, Papadopoulos N. Atypical atrial myxomas in two asymptomatic patients: a case report. *Cardiovascular ultrasound* 2009, 7:45 doi:10.1186/1476-7120-7-45
5. Jegier B, Jaszewski R, Lelonek M. Left atrial myxoma with an atrial septal defect. *Cardiology Journal* 2009 vol. 16 (6); 577-579
6. Biswas A, Thakur A. An unusual presentation of atrial myxoma in an elderly patient: a case report. *Cases Journal* 2008, 1: 384 doi:10.1186/1757-1626-1-1-384
7. Bogaert J, Taylor A, Van Kerkhove F, Dymarkowski S. Use of inversion recovery contrast enhanced MRI for cardiac imaging: spectrum of applications. *Am J Roentgenol* 2004; 182:609-15