

MANTOUX VS CHROMATOGRAPHIC IMMUNO-ASSAY, (CIA):- THE MAIDUGURI EXPERIENCE. A PROSPECTIVE STUDY AT UMTH AND IDH MAIDUGURI, 2011 TO 2015.**Dr. T. M. Dabkana^{1*}, B. B. Ajayi² and Dr. A. M. Bintube³**¹Consultant Orthopaedic Surgeon, Department of Orthopedics and Trauma Surgery, College of medical sciences, university of Maiduguri, Maiduguri Nigeria.²Chief Laboratory Scientist, Department of Immunology, University of Maiduguri Teaching Hospital, Maiduguri, Nigeria.³Chief Medical Officer in-Charge, Infectious Disease Hospital, Maiduguri.***Corresponding Author: Dr. T. M. Dabkana**

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ABSTRACT**Background**

The diagnosis of active tuberculous infection, both prompt and accurate is essential in the treatment of the disease. We discovered that the two non-invasive methods available to us in Maiduguri have some disparities in the results obtained. We therefore set out to investigate this prospectively over a period of four years. Results obtained confirmed our fears. **Methods and Design:** All patients that were suspected of having active tuberculous infection were subjected to both tests. The patient paid for the Mantoux test while the researchers paid for the CIA Kits. All results were then compared against other data such as ESR, AFB and X-Ray findings. **Results:** 152 patients with proven TB infection were enrolled into the study. 139 (91.4%) tested positive by Mantoux while only 19 (12.4%) tested positive with CIA. 13 (8.6%) tested negative with Mantoux while 133 (87.6%) tested negative with CIA. Only in about 6 (4%) cases were tests positive using the two Methods. **Summary:** The use of CIA in the diagnosis of tuberculous infection, both pulmonary and musculoskeletal should be done with a great caution since it misses a lot of patients with active disease.

KEYWORDS: Mantoux, TB Serology (CIA), Screening, Reliability, Maiduguri Nigeria.**INTRODUCTION**

Tuberculosis, a chronic infection caused by *mycobacterium tuberculosis bovis* and *hominis*, is still a cause for concern in many parts of the developing world. Prevention of this infection is key to preventing its devastating effect. Diagnosis however remains an important aspect of its management once the infection is established. This study set out to compare two of the modalities used for diagnosis: namely Mantoux which is a type IV delayed hypersensitivity reaction using purified protein derivative (PPD)^[5,6], available at both hospitals, and a serological test, (CIA),^[7,8] that detect IgG, IgA and IgM antibodies in whole blood, serum or plasma. Mantoux was done at both hospitals while CIA was done at UMTH. We set out to compare the two methods and determine their reliability in our hospitals, for screening and diagnostic purposes.

METHODS AND DESIGN

Two Centres were involved in the study, University of Maiduguri Teaching Hospital, (UMTH) and the Infectious Disease Hospital, (IDH) Maiduguri. All

patients that presented with signs and symptoms of TB infection; (bone, joint and pulmonary), were subjected to do the two tests at the same time. The patient paid for the Mantoux while the investigators paid for the kits used for serology (CIA). All patients, whether immunocompromised or not were included. The Mantoux reagent is manufactured by *BB-NCIPD Sofia, Bulgaria*, while the antigens used for the Chromatographic Immuno Assay are manufactured by *Hexagon TB Germany* and *CLINOTECH® DIAGNOSTICS, Canada*. The Mantoux was read after 72 hours and 10mm and above was taken to be positive while the CIA results were interpreted against controls given by the manufacturers. One hundred and fifty two (152) patients were enrolled into the study, spanning a period of four years. Those with open PTB and a Mantoux of 10mm or above at the IDH had their blood sent to UMTH for the CIA test while those that presented with TB of Bone and Joint at UMTH were subjected to the two tests. The ages of the patients, ESR, X-ray and duration of illness were taken into account. All the serology tests were done at UMTH, while the Mantoux

was done at the two centres, i.e. IDH Maiduguri and UMTH. We did not repeat the serology tests 2-7 weeks after the first tests as the companies suggested due to logistics.

RESULTS

A total of one hundred and fifty two (152) patients were enlisted into the study, one hundred and twenty at UMTH and thirty two at IDH, Maiduguri. There were fifty females and hundred and two males, giving a male: female of 2:1. Their ages ranged from 16 to 80years, with most of the patients being in their middle ages. Also these patients had well documented TB infection of either the chest (PTB) or musculoskeletal system. Table I below depicts the sexes of patients involved.

Table: 1

| | |
|--------|-----|
| Male | 102 |
| Female | 50 |

Table showing the patients based on sex

The ESR ranged from 1mm to 150mm with three quarters of the patients having an ESR of 40mm or above. In the patients with musculoskeletal TB, the spine was most affected 71 (59.2%), followed by the knees 38(31.7%), and hips 8(6.7%). The ankle joint was least affected.

Mantoux

Of the one hundred and fifty two patients with established infection, one hundred and thirty nine (91.4%) has a positive Mantoux and thirteen (8.6%) had a negative Mantoux. All patients with a Mantoux of 10mm or above were accepted as positive.

Serology

Of the one hundred and fifty two with established infection, only nineteen (12.5%) were positive while one hundred and thirty three (87.5%) were negative. This is shown in table II below.

Table II.

| Test modality | Positive | Negative |
|----------------|-------------|-------------|
| Mantoux | 139 (91.4%) | 13 (8.6%) |
| Serology (CIA) | 19 (12.5%) | 133 (87.5%) |

Table showing result obtained for each test

None of the patients had adverse effects because of the tests and all had routine treatment for their illnesses.

DISCUSSION

It is important to have a test that picks most patients with TB infection. The Polymerase Chain Reaction (PCR) (1-4) remains the best since it gives about 100% pick up, often very early in the disease process. It is however expensive. In an area where the infection is endemic, all patients with signs and symptoms of TB should be screened with a test that has high sensitivity. This is of more importance in patients with musculoskeletal TB since a misdiagnosis of the disease will have a lifelong devastating effect on the patient since this will lead to

permanent damage to bones and joints. The advocated repeat of the serology test 2-7 weeks after it is negative in patients with suspected TB infection is not good enough,^[9] since this may cause unwanted complications due to the delay in commencing treatment.

In Maiduguri, the best tests available now are Mantoux and the Serology (CIA) tests. From the results of the research as detailed above, the use of the CIA will miss most of the patients with active diseases (87.5%), while only 8.6% are missed using Mantoux. We tried to infer whether the UMTH laboratory is to blame but the staff are well trained and the kits used were in good condition. Also the techniques as detailed by the companies were strictly followed. We therefore implore other Centers to do a similar research. Both tests are specific for TB infection. It is also of note that Mantoux is cheaper than CIA and still has a higher pick up rate.

CONCLUSION

We strongly advice that the use of serology (Chromatographic Immuno Assay, {CIA}) for screening or testing of patients with suspected active TB infection to be done with extreme caution. We do however recommend the use of high index of suspicion, clinical signs and symptoms, X-Ray finding, ESR and Mantoux for the diagnosis of TB infection, whether it be of the joint and bone or pulmonary. In addition, AFB should be used for patients with pulmonary TB and where biological specimens can be obtained from the patient such as synovial or para vertebral collections in musculoskeletal infection.

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