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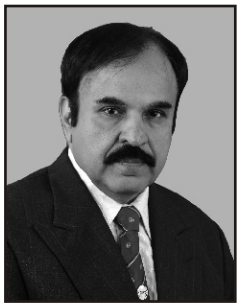

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Editor's Note

Dear Colleagues,

This edition of TAPIJ carries many informative articles and some unusual case reports.

Periodontitis is one of the most common and many times neglected complication in diabetic patients and the article on this subject draws the attention of the medical fraternity to this important complication. The importance of central blood pressure and its role in cardiovascular risk reduction has been highlighted.

There is also an interesting case report on Psoas abscess. Three unique case reports pertaining to neurology are discussed in detail.

A study to find out the prevalence of the more common serogroup types of leptospirosis in Central Chennai has been included.

Apart from that we have our regular reports on Toxicology, Dermatology and ECG section. This edition comes as a combination of various specialities to enlighten you and will add food for thought.

I request all members of API-TNSC to register for the 7th TAPICON, our annual conference to be held at Kodaikanal between 25th and 27th March 2011.

With regards,

Dr.Vijay Viswanathan

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Original Articles

A Study on Serogroup Profile of Leptospirosis in Central Chennai

Joseph Navaseelan A*; Raju D**; Shama Prakash K**

ABSTRACT

Aim: To study the serogroup profile of leptospirosis in Central Chennai.

Materials and Methods: This study was conducted in governmentt Kilpauk Medical College and Hospital (KMCH), Chennai between February 2009 and January 2010 which included 531 patients, clinically suspected of leptospirosis, of which 240 were males and 291 were females. Serum samples were collected and macroscopic slide agglutination test (MSAT) was done as the screening test for all patients. Microscopic agglutination test (MAT) was done for confirmation and detection of serogroups in patients with positive MSAT.

Results: 268(50.47%) patients showed positive MSAT, of which 121 were males and 147 were females. In this study MAT showed the following sero-prevalence pattern in decreasing order.; *L.grippotyphosa* (27.24%), *L.icterohaemorrhagiae* (23.88%), *L.pomona* (19.78%), *L.australis* (13.8%), *L.bataviae* (12.31%), *L.canicola* (2.61%), *L.autumnalis* (0.37%). The seroprevalence in males and females were 50.42% and 50.52% respectively.

Conclusions: *L.grippotyphosa* was the commonest sero-group followed by *L.icterohaemorrhagiae* and *L.pomona* in Chennai between February 2009 and January 2010.

Key Words: Leptospirosis, Sero-groups, Macroscopic slide agglutination test (MSAT), Microscopic agglutination test (MAT).

INTRODUCTION

Leptospirosis is a well known worldwide zoonotic disease with a greater incidence in tropics. In India, Leptospirosis is a grossly underreported disease probably due to lack of awareness of the disease among physicians[1]. The oetiological agent is *Leptospira interrogans* which has 23 serogroups and > 250 serovars, while *L. biflexa* is a free living organism and is not pathogenic to humans .Leptospirae are best visualised by dark field illumination and phase contrast microscopy[2]. A definitive diagnosis is made by isolation of organism from urine or blood but it takes time to develop in culture and growth is unreliable. In the leptospiraemic phase (< 7 days) diagnosis can be made by culture and PCR, while serological tests can be used for the diagnosis during the immune phase (≥ 7 days).[3]

Studies[4-6] done over a period of time showed that different types of sero-groups predominated over different periods of time. Studies done in 1995-1997 showed *L.autumnalis* as the predominant serogroup, while a study during 2004-2006 reported *L.icterohaemorrhagiae* as the predominant serogroup. The goal of the present study is to study the trend of sero-groups during the study period in Chennai. Studies have also reported that leptospirosis is common in males than females explained by higher exposures to leptospirosis risk factors like fishing, butchering and livestock farming among males[7]. Hence our study wanted to compare the seroprevalence of leptospirosis between males and females.

METHODS

This study was conducted in Kilpauk Medical College and Hospital, situated in central Chennai during the period between February 2009 and January 2010. A total of 531 patients with symptoms of leptospirosis (fever, headache, myalgia, conjunctival suffusion, jaundice) were enrolled in the study as suspected cases of leptospirosis, of which 240 were males and 291 were females. Serum samples were collected from the patients and sent to an exclusive leptospirosis

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laboratory for serological tests. MSAT was used as a screening test [8] and was done in all the patients to detect current infection. MSAT was done using a dense suspension of killed leptospirae mixed with a drop of serum on a slide, rotated on a rotator (120rpm) for 4 minutes and read in naked eye for agglutination. Those with agglutination were considered positive and MAT was done to detect the sero-group.

MAT was performed following a standard procedure using nine locally prevalent strains as antigens. The strains belonged to sero-groups *L.australis, L.autumnalis, L.bataviae, L.canicola, L.grippotyphosa, L.hebdomadis, L.icterohaemorrhagiae , L.pomona* and *L.sejroe*. A titre of 1:80 or more was taken as diagnostic criteria [9].

RESULTS

MSAT showed positive results for 268 patients, out of the total 531 suspected patients (50.47%). The 268 patients underwent MAT to detect the specific serogroup. In this study MAT showed the following seroprevalence pattern in decreasing order.; *L.grippotyphosa* 73/268 (27.24%), *L.icterohaemorrhagiae* 64/268 (23.88%), *L.pomona* 53/268 (19.78%), *L.australis* 37/268 (13.8%), *L.bataviae* 33/268 (12.31%), *L.canicola* 7/268 (2.61%) and *L.autamnalis* 1/268 (0.37%) (Table 1, Fig.1).

TABLE 1 Distribution of MSAT and MAT Among

MSAT	MALE	FEMALE	TOTAL
Tested	240	291	531
Positive	121 (50.42%)	147 (50.52%)	268 (50.47%)
MAT			
L.grippotyphosa	33	40	73(27.24%)
L.icterohaemorrhagiae	35	29	64(23.88%)
L.pomona	27	26	53(19.78%)
L.australis	15	22	37(13.8%)
L.bataviae	10	23	33(12.31%)
L.canicola	1	6	7(2.61%)
L.autumnalis	0	1	1(0.37%)

Of the total 268 MSAT positive patients, 121 were males and 147 were females with a seropositivity of 50.42% and 50.52% respectively (Fig.2).

This study further noted that the cases were reported throughout the year with seropositivity more during monsoon months (October, November, December, January showing 48, 40, 46, 22 cases respectively) in Chennai (Fig.3).

DISCUSSION

Studies from different parts of India showed a sero-prevalence ranging from 17.8% to 40.5% [6,9]. A study conducted in Madras Medical

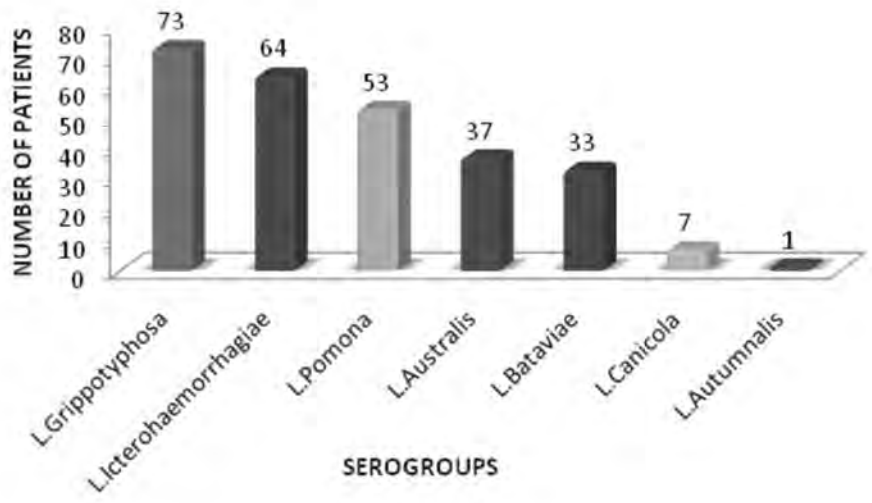


Fig. 1 Distribution of Cases between Serogroups

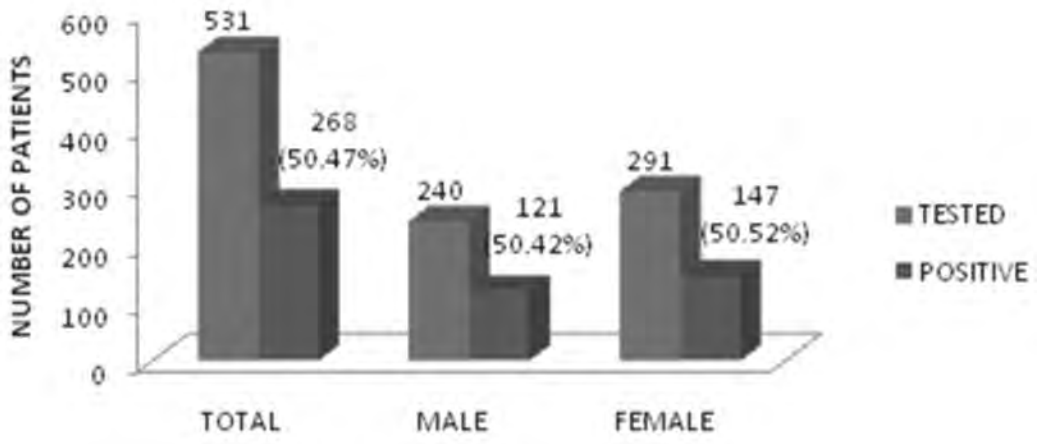
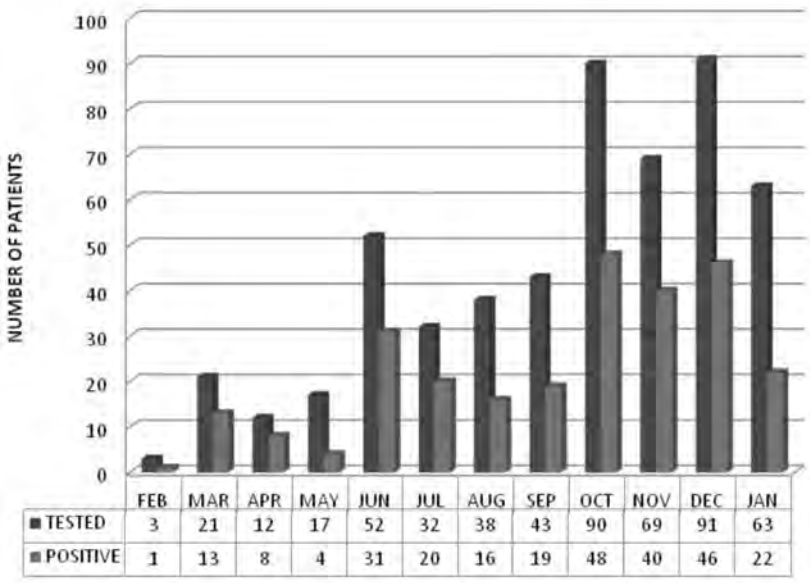


Fig. 2. Distribution of Cases between Sex (Males and Females)



	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN
TESTED	3	21	12	17	52	32	38	43	90	69	91	63
POSITIVE	1	13	8	4	31	20	16	19	48	40	46	22

Fig. 3. Monthwise distribution of cases from Feb 2009 to Jan 2010

College, Chennai during 2004-06 showed an increasing trend in the seroprevalence from 14.7% in 2004 to 32.3% in 2006 [6]. A study done by Sunil Sethi et al., in 2003 showed seropositivity of 5% but our study showed a seropositivity of 50.47% [1]. This can be attributed to the increasing awareness about leptospirosis among physicians and laboratories but also contributed by the polluted environment, an important risk factor for leptospirosis.

A study conducted in Andaman and Nicobar in 2004 showed seroprevalence of 52.7% among high risk population and 14.7% among other population, with *L.grippotyphosa* being the commonest serogroup followed by *L.australis*[13]. A study conducted in Calicut showed seroprevalence of 38.1% among high risk groups and 24 % in others. *L.pomona* , *L.shermani* ,*L.canicola* were the common serogroups[12] .In a study at Maharashtra the serovars isolated were *L. Icterohaemorrhagie* , *L. canicola* and *L. australis* [14]. A study conducted in Chennai during 1995-97 showed *L.autumnalis* as the commonest sero-group followed by *L.icterohaemorrhagiae* [4]. A study done in Kolancheri, Kerala during the same period also showed same sero-groups[5]. Shivakumar et al in their study in Chennai during 2004-06 reported *L.icterohaemorrhagiae*

(48%) as the commonest sero-group followed by *L.australis* (37%) and *L.grippotyphosa* (26%) [6]. Our study showed *L.grippotyphosa* (27.24%) as the predominant serogroup followed by *L.icterohaemorrhagiae* (23.88%) and *L.pomona* (19.78%).

This study noticed that there is no difference between males and females with regard to leptospiral seropositivity (males 50.42% Vs females 50.52%). A study done by Andreas Jansen et al [10]., also found no differences in the sero-prevalence between males and females, however it reported a more severe disease occurring in males while females had a milder course. In a study by Angnani R et al [11], sero-prevalence was more common in males (43.43%) than in females (21.31%) and the low sero-prevalence noted in females may be due to milder disease and hence are frequently underreported.

To conclude, *L.grippotyphosa* (27.24%) followed by *L.icterohaemorrhagiae* (23.88%) and *L.pomona* (19.78%) were the predominant sero-groups in Chennai during the study period. There was no sex difference in the seropositivity of leptospirosis. Cases of leptospirosis were reported throughout the year with peak incidence during monsoon season. Hence Chennai is endemic for leptospirosis.

REFERENCES

1. Sunil Sethi, Archana Sood, Pooja, Saritha Sharma, Caeser Sengupta and Meera Sharma: Leptospirosis in Northern India: A clinical and serological study, South East Asian J Trop Med Public Health; Vol 34, No 4, December 2003:822-825.
2. Rao R. Sambashiva., Gupta Naveen., Bhalla P and Agarwal S K.; Leptospirosis in India and Rest of the World-The Brazilian Journal of Infectious Diseases 2003; 7(3), pages 178 – 193.
3. Shivakumar S and Krishnakumar B: Diagnosis of Leptospirosis – Role of MAT, J Assoc Physicians of India; Vol 54, April 2006: 338-339.
4. Pradeep KS., Sumathi G., Rao GV and Kumar SS.; Leptospirosis laboratory-Chennai Medical College: A 3 years experience in serodiagnosis. Indian J Med Microbiology 1999; 17, 50-1.
5. Kuriakose M., Eapen C.K and Paul R: Leptospirosis in Kolenchery, Kerala, India: Epidemiology, prevalent local serogroups and serovars and a new serovar, European Journal of Epidemiology; Vol 13(6), September 1997.
6. Sumathi G., Narayanan R and Shivakumar S: Leptospirosis laboratory-Madras Medical College: Review of our experience(2004-06), Indian J Med Microbiology; Vol 26(2) April-June 2008, pages 206-7.
7. Paul N. Levett; University of the West Indies, School of Clinical Medicine & Research, and Leptospira Laboratory, Ministry of Health, Barbados: Leptospirosis. Copyright American Society for Microbiology,Clin Microbiol Rev 2001; 14:296 – 326
8. Sumathi G., Chinari Pradeep KS and Shivakumar S., MSAT – A screening test for leptospirosis; Indian J Med Microbiology 1997; 15(2), 84.
9. Muthusethupathi M A, Sumathi G, Subudhi CPK, Manuel HPS, shivakumar KS and Rajendran S: Serodiagnosis of leptospirosis – A Madras study(1994-5); Indian J Med Microbiology 1995; 13(4), 192-195.
10. Andreas Jansen., Klaus Stark., Thomas Schneider and Irene Schoneberg; Sex differences in clinical leptospirosis in Germany 1997-2005; Clinical infectious diseases 2007; 44 e69-e72.
11. Angnani R., Pathak AA and Mishra M.; Prevalence of leptospirosis in various risk groups; Indian J Med Microbiology 2003; 21(4), 271-273.
12. Swapna RN, Tuteja U, Nair L and Sudarsana J: Seroprevalence of leptospirosis in high risk groups in calicut, North Kerala, India. Indian J Med Microbiol 2006 24(4). 349-352.
13. Sharma S, Vijayachari P, Attayoor P.S, Kalimuthusamy N and Subhash C. Sehgal: Seroprevalence of leptospirosis among high risk population of Andaman Islands, India. Am J Trop Med Hyg 74(2) 2006: 278-283.
14. Shivakumar S, Leptospirosis-current scenario in India, Medicine update 2008. Volume 18:799-809. Published by S.K.Bichile, Chairman, Scientific Committee, APICON 2008 at Mumbai.

Periodontitis : The Sixth Complication of Diabetes

T.Sundararaj,* S.Dhinahar**

Abstract

Tissue damage of Diabetes is well known in causing various micro and macro vascular complications. The oral complications are important but often not mentioned even in textbooks on Diabetes.

Hence a retrospective study was undertaken to highlight the prevalence of this complication from a medical college and a dental college. The study revealed a considerable number of Periodontitis in Diabetic patients. Similarly Diabetes was diagnosed in significant number of Periodontitis patients. This number was compared with the figures in the literature. The figures quoted were much higher. Even the five to seven percent noted in our study is important while considering the huge number of diabetics and Periodontitis reported.

Knowing the possible triggering of the development and progression of

Diabetes in addition to promoting Coronory and cerebral complications,

Periodontitis should be vigorously treated. Such patients are to be screened for

Diabetes and prediabetes and are at high risk.

Key words

Periodontitis, AGE, Plaque, gingivitis

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Back ground

Tissue damage is well described in Diabetes Mellitus through proinflammatory cytokines. Micro vascular complications are the Hallmark of Diabetes manifesting as Retinopathy, Neuropathy and Nephropathy. Macro vascular complications produced in association with dyslipidemia and Atherosclerosis manifest as Coronory artery disease, cerebro vascular disease and Peripheral vascular disease.

The important complication often forgotten even by textbooks on Diabetes is the oral complication of diabetes described by some as sixth complication of diabetes to stress its importance. (Ref 4) There are many oral complications of diabetes like Periodontitis, caries, ulcers and candidiasis.

Among the many complications mentioned Periodontitis is important as it plays a dual role. It can trigger the onset of diabetes as well as its progression in addition to promoting Coronary and cerebral complications (ref 1) Vice versa Diabetes will produce severe Gingivitis leading on to Periodontitis. (ref 1)

Course of Periodontitis:

Plaque leads to gingivitis and then to Periodontitis . Next plaque hardens pulling gums away from the tooth thus forming pockets of infection. Subsequently bone is affected loosening the tooth and ending in loss of tooth.

Objective:

To show the prevalence of periodontitis in the diabetic patients as well as the prevalence of Diabetes in the periodontitis patients and thereby draw the attention of the medical and dental fraternity to this (sixth or seventh) complication of diabetes.

Periodontitis is due to

1. The bacteria thriving in presence of high sugar.
2. With lazy white cells, AGE (Advanced Glycosalation End products) with abnormal

collagen binding to monocytes producing pro inflammatory cytokines causing tissue destruction.

3. Thickening of blood vessel walls with slow flow of blood and incomplete removal of waste products.
4. Reduced healing in Diabetes.
5. Increased susceptibility in Diabetes.

Methods

A study of periodontitis and diabetes at Tirunelveli medical college and Saveetha dental college were done for three months January, February & march 2010.

The statistics of the three month is taken.

Tirunelveli Medical College Dental Department

Outpatients – 3527 (January 2010); 3482 (February); 3195 (march) = Total 10204

Gum diseases – 1210 (January); 1080 (February) ;1312 (march) = Total 3602

Percentage of gum diseases = 3602 / 10204

= 32.9% = 33%

Diabetics among them = 180 = 180/3602 = 5%

Saveetha dental college, Chennai

Monthly average outpatients -4082 (January) ; 4310 (February) ; 4474 (March)

Total = 12866

Gum disease patients – 2392 (January) ; 2613 (February) ; 2142 (march) Total = 7147

Percentage of gum diseases = 7147 / 12866

= 55%

Diabetics among them = 352 = 352 / 7147 = 7%

Refer table 1.1, table1.2, table2.1 and table 2.2

Table 1.1 Outpatient statistics of Saveetha Dental College, Chennai

PERIOD	MALE	FEMALE	TOTAL
Jan 2010	2329	1753	4082
Feb 2010	2287	2013	**4310**
Mar 2010	2495	1979	**4474**

Table 1.2 Number of Periodontitis among them

PERIOD	MALE	FEMALE	TOTAL
Jan2010	855	679	1534
Feb2010	834	792	**1626**
Mar2010	796	594	**1350**

Diabetics confirmed for the three months – 352.

Table 2.1 Outpatient statistics of dental department of Tirunelveli Medical College:

PERIOD	MALE	FEMALE	TOTAL
Jan2010	1660	1822	3482
Feb2010	1732	1463	**3195**
Mar2010	1762	1765	**3527**

Table 2.2 Gum disease among them

PERIOD	MALE	FEMALE	TOTAL
Jan2010	576	504	1080
Feb2010	702	610	**1312**
Mar2010	705	505	**1210**

Confirmed Diabetics among them for the three months – 180.

An attempt was made to compare this with the statistics of the diabetic clinic of Tirunelveli medical college. All cases of Diabetes were referred to dental and eye department as a routine.

Results of the study

Our study gave a figure of 5% of diabetics in Tirunelveli medical college suffering from Periodontitis and 7% of Periodontitis patients of Saveetha dental college, Chennai suffering from diabetes.

Ideally we should have a 10 year study of all diabetic patients for Periodontitis and all Periodontitis patients for diabetes. No such statistics is available in both colleges.

But a study is available in the following references

In a recent paper by Dr. Herald Loe, department of periodontology, University of Connecticut and Robert J. Genco, State

university of New York described the study in JADA of 263 patients 9.8 % with type I diabetes developed periodontal disease in contrast to a mere 1.7 % in non diabetics. (Ref 4)

In another study on Pima Indians 40 % of type 2 diabetic had periodontal disease with alveolar loss. Toothless ness was 15 times more in type 2 diabetics. Life threatening deep neck infection and fatal palatal ulcers has been described arising from Periodontitis.

Thus a strong relation between dental periodontitis and diabetes has been shown by our study along with the study quoted in the literature and also as per the other references.

Conclusion

We have to be on the look out for Diabetes in all dental departments and dental colleges by doing a routine blood sugar study. Same way all diabetic patients should be referred to dental department to rule out Periodontitis and a registry should be maintained in the medical and dental colleges . A portion of the morbidity in oral complication in Diabetes and its contributory effect towards other diabetic complications could be prevented.

Acknowledgements

We thank the Dean, Tirunelveli medical college and the principal, Saveetha dental college for according permission to go through the records and the department personnel for helping us to get these figures.

References

1. Samuel C .Duro, oral manifestations of diabetes, Harrison's principles of Internal medicine,17th edition, vol 1, p 214 – pathology, course, cad & cvd.
2. John Pickup & Gareth Williams textbook on diabetes, III edition, 2003, with 2 volumes running to thousands of pages.
3. Martin Gills & Steven Saxon , Annual Periodontitis J 2001, Dec 6 (1)125 to 137 updated on 21-07-2006 – course Dentistry in Diabetes diagnosis and management.
4. Loe H Periodontal disease, the 6th complication of diabetes mellitus, Diabetes care, 1993, 16, 329 to 334.
5. Little J W Fallace A miller, CS Rhodu ML , Dental management of medically compromised patients, 6th edition, St.Louis Moslay 2002 ,154,248 to 70 & 548 to 632.
6. Vernillo AT, Diabetes Mellitus relation to dental & oral surgery, oral medicine, oral pathology Enlod 2001 , 91, 263 -70.
7. Ervasti T. Knurtilla, Poihoma L Harkipuea K, Relation between control of diabetes and gingival bleeding, journal of Periodontitis, 1985, 56, 1547.
8. Measley B Diabetes and periodontal disease, J of Periodontitis, 1999, 70, 935 -49.
9. Taylor G The effect of periodontitis treatment of diabetes, JADA, 2002, 134, (Supplementary) 415 – 485.
10. Bell GW George DM, Barclay SC, oral health care in Diabetes mellitus, SADJ, 2000, March, 55(3) 158 -65.

Awareness about HbA_{1c} test in type 2 diabetic patients during registration in a tertiary care centre in India

Srikanth Medimpudi, Satyavani Kumpatla, Vijay Viswanathan

ABSTRACT

Background: Glycosylated haemoglobin (HbA_{1c}) testing has become routine practice and maintenance of HbA_{1c} within the normal range leads to improved metabolic control. AIM: To assess the awareness of HbA_{1c} test among type 2 diabetic patients at the time of registration in a tertiary care centre in India.

Research Design And Methods: We conducted a cross-sectional survey of 240 (M: F 146:94) newly registered adults with type 2 diabetes in a tertiary care centre. Baseline demographic data of all patients was obtained. A researcher-administered survey was done to test patient's knowledge on HbA_{1c} test, their goal and their last A_{1c} result. Factors which could influence the patient's knowledge of HbA_{1c} were also recorded.

Results: Only 11% of total patients knew about HbA_{1c} test. About 69% of those who know about HbA_{1c} test knew their target goal also. Overall only 6.7% patients knew about HbA_{1c} test, their goal and last A_{1c} result. Eighty nine percent didn't know about HbA_{1c} test. Low income groups are more ignorant compared to high income group. Patients who had not visited the hospital regularly had poor awareness than who had more (> 4) visits per year (71.5% vs. 28.5%). Awareness levels were poor among patients attending a general physician than patients attending a diabetes care specialist (57.9% vs. 37.9%).

Conclusion: HbA_{1c} awareness among Indian patients with diabetes during registration in tertiary care centre is very poor. Patients with less number of consultations per year, lower educational levels, low income and urban hailing had poor knowledge about the HbA_{1c} test.

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INTRODUCTION

Diabetes is a common chronic condition that can lead to significant morbidity and mortality [1,2]. Evidences show that achieving good glycemic control can delay or prevent complications of both type 1 and type 2 diabetes [3-5]. The primary goal in the treatment is to reduce and maintain blood glucose levels in the near normal range and it provides an opportunity for patients to live without complications [6]. Glycosylated hemoglobin (A_{1c}) test which provides an index of a patient's average blood glucose level for the past 2-3 months [7], is the most widely accepted and reliable measure of long-term glycemic control.

Many factors like age, adherence to prescribed hypoglycemic medications [8], diet and life style modification play a significant role in attaining good control, but awareness about HbA_{1c} test itself [9] with goal oriented approach in attaining target A_{1c} is also crucial. Patients were more likely to follow life style changes when the importance of maintaining goal A_{1c} for good glycemic control was stressed. Follow-up visits with health care providers [10] and self monitoring of blood glucose also play an important role in the maintenance of glycaemic control. Patients' understanding of HbA_{1c}, its goal and implications of uncontrolled A_{1c} on long-term health risk is essential.

Patients' knowledge about diabetes and HbA_{1c} comes mainly from health care providers. Clinicians have the opportunity to use this test to improve diabetes management and they should discuss about the results with the patients [11]. The use and interpretation of HbA_{1c} results among physicians [12] have been studied, but there is paucity in studies of patients' knowledge, and understanding of HbA_{1c} testing. The aim of this study was to assess the awareness about HbA_{1c} test in type 2 diabetic patients during registration in a tertiary care centre and to identify the factors influencing the patient's knowledge of HbA_{1c}.

RESEARCH DESIGN AND METHODS

The study subjects were selected from a tertiary care centre for diabetes in India during the period of August to October 2007. We studied 240 (M: F 146:94) randomly selected type 2 diabetic patients newly registered in the out patient department. . Patients of all socio-economic strata attend the centre for routine management of diabetes. The study patients were treated elsewhere for diabetes and for the first time they had registered in our centre. All the participants gave informed consent.

Each patient's baseline demographic data on age, sex, location (urban / rural), annual household income ($\leq$ Rs. 100000 or > Rs. 100000), education (illiterate, School/high school, college) and duration of diabetes were recorded. Patients were asked to fill up a short questionnaire designed to obtain information about anti diabetic medications they were currently taking (diet, oral medication only, insulin only, Insulin + OHA), average number of visits per year that patients had to their health care provider (including visits to emergency rooms or hospital admission), whether treated by a physician / diabetes care specialist / self treated and asked whether they perform self monitoring of blood glucose at home or not. The questionnaire was evaluated in 10 patients in a pilot study prior to administering it to the study patients and minimal changes were made prior to standarization.

A researcher-administered survey was then employed to assess patients' awareness about HbA_{1c} test, their target goal and last A_{1c} value. Each study patients responded to three open ended questions including "What does HbA_{1c} test mean?" (Respondents were classified as having accurate awareness about the test if they answered it as overall glycemic control test or 2-3 months blood sugar average test. Respondents were coded as unaware of the test if they answered wrongly or if responded, "I don't know.").

Respondents who were aware of the test were then asked, "What is your HbA_{1c} goal?" (We classified respondents as 'Aware and goal known' if they mentioned their target goal as less than 7%. Respondents were coded as not knowing goal if they answered wrongly or if responded, "I don't know."). Respondents who were aware of their goal were then asked, "What is your last HbA_{1c} result?" (We classified respondents as knowing their HbA_{1c} value if their actual test result was within 0.5 percentage points of the lower or upper boundary of the mentioned value). For example, if respondents reported that their HbA_{1c} was 7, they were grouped as knowing their HbA_{1c} if their recorded HbA_{1c} was within 6.5-7.5. Respondents were coded as not knowing their value if their estimate differed by > 0.5% or if responded, "I don't know"). Patients who are unaware of the HbA_{1c} test were educated regarding the test and their target goal.

Patient's medical records were reviewed to confirm the above information as well as to document respondents' most recent HbA_{1c} results taken before the survey. If respondents had no documented HbA_{1c} results, we recorded this value as 'no result'. Mean, standard deviation and proportions are reported as relevant. SPSS version 10 © was used for statistical analysis.

RESULTS

A total of 240 (M: F 146:94) subjects with type 2 diabetes were enrolled and none of them refused to participate in the study. The mean age was 50.2 ± 11.3 years and most patients were diagnosed with diabetes 5.41 ± 5.2 years prior to the study. Table 1 shows the demographic and clinical characteristics of the study subjects. The majority of patients were hailing from urban areas (86.3%). Regarding the education levels, 56.3% had a high school education or less, 35.8% are graduates and 8% are illiterates. About 96.7% had an annual household income of Rs.100,000 or less. At the time of survey, , 85% were using oral hypoglycemic agents alone, 14.6% were using insulin in combination with or with out oral agents and 0.4% of patients were being managed exclusively with diet.

Table 1: Demographic and clinical characteristics of the study subjects

N, M:F	240 (146:94)
Age (years) (Mean, SD)	50.2 ± 11.3
Duration of diabetes (years) (Mean, SD)	5.4 ± 5.2
Location	n (%)
Rural ($n = 33$)	33 (13.8)
Urban ($n = 207$)	207 (86.3)
Education	
Illiterate	19 (7.9)
School / High school	135 (56.3)
College	86 (35.8)
Annual income (INR)	
≤ 100,000	232 (96.7)
> 100,000	8 (3.3)
Treatment	
OHA	204 (85)
Insulin OHA	35 (14.6)
Diet	1 (0.4)

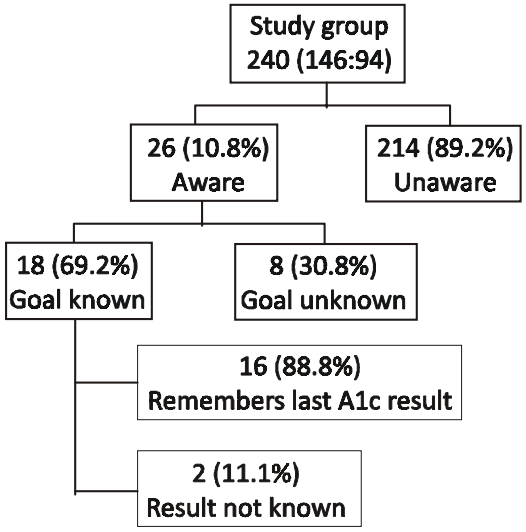

Figure 1: Details of awareness about HbA_{1c} test among the study subjects

Figure 1 shows the details of awareness about HbA_{1c} test among the study subjects. 89% (214/240) of the subjects does not know about HbA_{1c} test, while 11% (26/240) knew about HbA_{1c} test. 69% (18/26) of those who know about HbA_{1c} knew their HbA_{1c} goal also and 89% (16/18) of them remember their last A_{1C} result. Overall, only 7.5% (18/240) of total patients knew about HbA_{1c} test and their target goal and 6.7% (16/240) knew about HbA_{1c} test, their goal and last A_{1c} result.

Table 2 shows the description of subjects who are unaware of HbA_{1c} test. A larger percentage of subjects are hailing from urban areas (85%) Male preponderance was seen in unawareness about the HbA_{1c} test. Majority of the subjects had lower levels of education in this group of subjects (67.3% vs. 32.7%).

Table 2: Description of subjects who are unaware of *HbA_{1c}* test

Gender	n (%)
Men	131 (61.2)
Women	83 (38.8)
Duration of diabetes (years)	
< 10	164 (76.6)
≤ 10	50 (23.4)
Location	

Rural	32 (14.9)
Urban	182 (85.5)
Education	
Illiterate	19 (8.9)
School / High school	125 (58.4)
Collage	70 (32.7)
Annual income (INR)	
≥ 100,000	207 (96.7)
> 100,000	7 (3.3)
Frequency of hospital visits per year	
< 4	153 (71.5)
≥ 4	61 (28.5)
SMBG	
Subjects who perform SMBG	40 (18.7)
Subjects who do not perform SMBG	174 (81.3)
Treatment	
Self	9 (4.2)
Physician	124 (57.9)
Diabetologist	81 (37.9)

Low income group of subjects are more ignorant about the test compared to high income group (96.7% vs. 3.3%). Patients who had not visited hospital regularly (< 4 hospital visits per year) had poor awareness than who had more (≥ 4) hospital visits per year (71.5% vs. 28.5%). Awareness levels are less among patients attending a general physician than patients attending a diabetes care specialist (57.9% vs. 37.9%). Higher percentages are unaware about the test in the group of subjects who do not perform self monitoring of blood glucose (81.3% vs. 18.7%).

DISCUSSION:

The present study was done with a questionnaire and assessed patients knowledge about HbA_{1c} test during registration in a tertiary care centre for diabetes in India. Nearly 89% of the patients do not have knowledge about HbA_{1c} test. Only 6.7% of the patients knew about HbA_{1c} test, their goal and last A_{1c} result. In India, numerous national and international organizations are working for the past decade in raising public awareness of the role of HbA_{1c} in the developmentof diabetes-related complications. Individual medical health facilities dedicated to diabetes care also educate their patients about HbA_{1c}, and motivate their patients in a goal oriented fashion, but the HbA_{1c} awareness among Indian patients with diabetes during registration in a tertiary diabetes care centre is still very poor as per our study finding. Very few respondents in our study knew their target HbA_{1c} goal.

A cross sectional study in US population examined the relationship between patient's knowledge of recent HbA_{1c} value and self management of diabetes. A minority of diabetic patients knew their most recent HbA_{1c} value and those who knew their HbA_{1c} values reported significantly better understanding about diabetes care [13]. Many of the earlier studies reported similar findings [14'15]. Contrary to the above findings, another study conducted in Norway by Skie etal [16] reported that majority of the studied type-1 diabetic patients were aware of their last A_{1c} result and most patients knew their target HbA_{1c}.

In our study majority of subjects who are unaware about the test are hailing from urban areas. They had lower levels of education and most of them belong to low income group. Patients who have not visited hospital regularly and patients attending a general physician had poor awareness about the HbA_{1c} test. A high percentage of subjects are unaware in the group of subjects who do not perform self monitoring of blood glucose.

A study in the United States showed that 66% of patients did not know their last A_{1c} result and only 25% accurately reported the value. Knowledge of A_{1c} result was associated with higher educational levels []. Low levels of education were one of the reasons for unawareness about the test in our study. Knowledge about the test was poor despite majority of subjects are from urban areas.

In an earlier study we found that majority of patients who attend a tertiary care centre for

diabetes care knew about HbA_{1c} test and half of them were aware about their target goal. Awareness about the test had a positive impact on maintenance of better glycaemic control (unpublished). Knowing about A_{1c} test, particularly target goal motivates patients to effectively manage their diabetes, as well as positively reinforces those patients who are already effectively managing their diabetes. Scientific advances and advantages must be translated into practical steps, so that patients can use them to improve their health. There should be an increased focus on encouraging patients to be aware of and discuss specific information pertaining to their diseasestatus and markers, such as HbA_{1c}, blood pressure, and lipid values with their clinicians.

CONCLUSION:

In conclusion, our study showed that type 2 diabetic patient's knowledge about HbA_{1c} test was very poor during registration in a tertiary care centre for diabetes. Low levels of education, less number of hospital visits, non performance of self monitoring of blood glucose were associated with unawareness about the HbA1c test. Clinicians should provide information about this test and discuss their glycaemic goals to improve diabetes management.

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REFERENCES:

1. Nathan DM: Long term complications of diabetes mellitus. *N Engl J Med* 1993, 328:1676–1685.
2. Gu K, Cowie C, Harris MI: Mortality in adults with and without diabetes in a cohort of the U.S. population, 1971–1993. *Diabetes Care* 1998, 21:1138–1145.
3. The Diabetes Control and Complications Trial Research Group: The effect of intensive treatment of diabetes on the development and progression of long-term complications in insulin-dependent diabetes mellitus. *N Engl J Med* 1993, 329:977–986.
4. UK Prospective Diabetes Study (UKPDS) Group: Intensive blood glucose control with sulphonylureas or insulin compared with conventional treatment and risk of complications in patients with type 2 diabetes (UKPDS 33). *Lancet* 1998, 352:837–853.
5. Shichiri M, Kishikawa H, Ohkubo Y, Wake N: Long-term results of the Kumamoto study on optimal diabetes control in type 2 diabetic patients. *Diabetes Care* 2000, vol 23, supplement 2, B21
6. Bloomgarden Z.T. American Diabetes Association 60^{th} scientific sessions, 2000. Glucose tolerance diabetes and cancer, glycaemic control, monitoring and related topics. Diabetes care 2001, 24 779-784.
7. Gonen B, Rachman H, Rubenstein AH, Tanega SP, Horwitz DL: Hemoglobin A_{1c} as an indicator of the degree of glucose intolerance in diabetics. *Lancet* 1977, 2:734 -737.
8. Musey VC, Lee JK, Crawford R, Klatka MA, McAdams D, Phillips LS: Diabetes in urban African-Americans. I. Cessation of insulin therapy is the major precipitating cause of diabetic ketoacidosis. *Diabetes Care* 1995, 18:483–489.
9. Bernard AM, Anderson L, Cook CB, Phillips LS: What do internal medicine residents need to enhance their diabetes care? *Diabetes Care* 1999, 22:661–666.
10. Slocum W, Ziemer DC, Culler SD, Cook CB, Ferguson SY: Poor appointment keeping behavior worsens glycemic control (Abstract). *Diabetes* 1999, 48:A197.
11. Delmater A.M. Clinical use of hemoglobin A1c to improve diabetes management. Clinical Diabetes 2006, 24, 6-8.
12. Kolatkar NS, Weiss SL, Cembrowski GS, Mazze RS, Hollander P. Comparing methods of estimating maximum allowable analytical error in glycohemoglobin testing [Letter]. Am J Clin Pathol 1995, 103:771-772.
13. Heisler M, Piette J.D., Spencer M, Kieffer E, Vijan S. The relation ship between knowledge of recent HbA_{1c} values and diabetes care understanding and self management. Diabetes Care 2005, 28, 816-822.

14. Beckles GL, Engelgau MM, Narayan KM, Herman WH, Aubert RE, Williamson DF: Population-based assessment of the level of the care among adults with diabetes in the U.S. Diabetes Care 1998, 21:1432-1438.

15. Harwell TS, Dettori N, McDowall JM, Quesenberry K, Priest L, Butcher MK, Flook BN, Helgerson SD, Gohdes D: Do persons with diabetes know their A_{1c} number? *Diabetes Educ* 2002, 28:99 -105.

16. Skeie S, Thue G, Sandberg S: Interpretation of hemoglobin A_{1c} (HbA_{1c}) values among diabetic patients: implications for quality specifications for HbA_{1c}. *Clin Chem* 2001, 47:1212 -1217.

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Review Articles

TYPHOID – A review in the 21st century

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Typhoid fever is a systemic disease characterized by fever and abdominal pain and is caused by dissemination of *Salmonella* Typhi. Salmonella is a gram-negative, non–spore-forming, facultatively anaerobic bacillus. Salmonellae are named for the pathologist Salmon, who first isolated S. choleraesuis from porcine intestine.[1] The disease was initially called *typhoid fever* because of its clinical similarity to typhus (typhus like = typhoid). However, in the early 1800s, typhoid fever was clearly defined pathologically as a unique illness on the basis of its association with enlarged Peyer's patches and mesenteric lymph nodes. In 1869, given the anatomic site of infection, the term *enteric fever* was proposed as an alternative designation to distinguish typhoid fever from typhus.Paratyphoid fever is a similar illness caused by *S.* Paratyphi A, B, or C.

Typhoid fever is a global health problem. It has been estimated that approximately 17 million cases of typhoid fever and 600 000 associated deaths occur annually.[2] The disease is endemic in many developing countries, particularly in the Indian subcontinent, Southeast Asia, South and Central America, and Africa, with annual incidence rates estimated to be greater than 900 per 100,000 population in India.[3] Typhoid fever also has a very high social and economic impact because of the hospitalization of patients with acute disease and the complications and loss of income attributable to the duration of the clinical illness.[4]

Transmission

Humans are the only natural host and reservoir for S.typhi & S.Paratyphi. The highest incidence occurs where water supplies serving large populations are contaminated with faeces of infected persons. Waterborne transmission involves the ingestion of fewer microorganisms and, as a result, has a longer incubation period and lower attack rate compared with foodborne transmission. Ice cream is recognized as a significant risk factor for the transmission of typhoid fever. Shellfish taken from contaminated water, and raw fruit and vegetables fertilized with sewage, have been sources of past outbreaks. Although direct person-to-person transmission is uncommon, person-to-person transmission of *S.* Typhi, including anal-oral transmission, has been reported.[5] Health care workers can acquire the disease from infected patients as a result of poor hand hygiene or handling laboratory specimens.[6]

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Pathogenesis

All *Salmonella* infections begin with ingestion of organisms in contaminated food or water. The infectious dose is 10^3–10^6 colony-forming units. Conditions that decrease stomach acidity (age < 1 year, H2 blockers or proton pump inhibitor ingestion) increase susceptibility to *Salmonella* infection.Once Salmonella reach the small intestine, they penetrate the mucous layer of the gut and reside within Peyer's patches. After crossing the epithelial layer of the small intestine, they are phagocytosed by macrophages and disseminate throughout the body in via the lymphatics and reach the reticuloendothelial system (liver, spleen, lymph nodes, and bone marrow.

Signs and symptoms

Typhoid fever is characterised by a slowly progressive fever as high as 40°C (104°F), abdominal discomfort, and non bloody diarrhoea. The incubation period for *S.* typhi averages 10–14 days but ranges from 3 to 21 days, with the duration likely reflecting the inoculum size

and the host's health and immune status. The most prominent symptom is prolonged fever (38.05° – 40.5°C; 101.8° – 104.9°C, which can continue for up to 4 weeks if untreated.

The term *Enteric fever* is a misnomer, in that the hallmark features of this disease—fever and abdominal pain are variable. Thus, a high index of suspicion is necessary when a person presents with prolonged fever in endemic areas. *S*. Paratyphi A is thought to cause milder disease than *S*. Typhi, with predominantly gastrointestinal symptoms. However, a prospective study of 669 consecutive cases of enteric fever in Kathmandu, Nepal, found that the infections were clinically indistinguishable.[7]

Frequency of common symptoms [7]

headache	80%
anorexia	55%
chills	35 to 45%
cough	30%
abdominal pain	30 to 40%
diarrhoea	22 to 28%
nausea, vomiting	18 to 24%
myalgia	20%
constipation	13 to 16%
arthralgia	2 to 4%

Physical findings included coated tongue (51–56%), splenomegaly (25–30%), and abdominal tenderness (5-10%). In endemic areas, most patients presenting to hospitals with enteric fever are between 5 and 25 years of age. When children younger than 1 year of age acquire typhoid, the disease is often more severe and is associated with a higher rate of complications.[8]

In the second week of the infection, fever plateaus around 40 $C (104 $F) and bradycardia may develop. Relative bradycardia is neither a sensitive nor a specific sign of typhoid fever, occurring in fewer than 50% of patients.[9, 10] Rose spots appear on the lower chest and abdomen in around a third of patients. Diarrhea can occur in this stage; however, constipation is also frequent. The spleen and liver are enlarged and tender.

In the third week of typhoid fever, a number of complications can occur:

- Intestinal hemorrhage due to bleeding in congested Peyers' patches
- Intestinal perforation in the distal ileum. It may occur without alarming symptoms until septicemia or diffuse peritonitis sets in.
- Encephalopathy
- Metastatic abscesses, cholecystitis, endocarditis and osteomyelitis

Neuropsychiatric manifestations, including apathy, psychosis, and confusion, occur in 5% to 10% of patients and may be related to cytokine release from *S*. Typhi infected macrophages.[12] Seizures and coma are reported in less than 1% of persons, and seizures may represent febrile seizures of childhood. The cerebrospinal fluid usually is normal, and abnormal CSF studies or recurrent seizures should suggest another diagnosis.[11]

Salmonella have a propensity for infection of vascular sites, and high-grade or persistent bacteremia suggests an endovascular infection or endocarditis.[12] The risk of endovascular infection complicating Salmonella bacteremia is estimated to be 10% to 25% in persons over 50 years of age, usually involves the aorta, and most commonly results from seeding atherosclerotic plaques or aneurysms. Mortality rates range from 14% to 60% and are lower with prompt diagnosis and combined medical and surgical therapy. Venous septic thrombophlebitis also has been reported.[13]

Chronic Carrier State

The chronic carrier state is defined as the persistence of Salmonella in stool or urine for periods greater than 1 year. Up to 10% of untreated patients with typhoid excrete *S*. Typhi in the faeces for up to 3 months, and 1% to 4% develop chronic carriage. The frequency of chronic carriage is higher in women, in persons with biliary abnormalities or concurrent bladder infection with *Schistosoma haematobium,* and in infants. Chronic carriage of *S*. Typhi and *S*.

Paratyphi A has been associated with an increased incidence of carcinoma of the gallbladder and of other gastrointestinal malignancies.[14] Serology for the Vi antigen can be useful in distinguishing chronic carriage from acute infection with *S.* Typhi, because chronic carriers will often have a high antibody titer to this antigen.[15] A person may become an asymptomatic carrier of typhoid fever, suffering no symptoms, but capable of infecting others.

Diagnosis

The definitive diagnosis of typhoid fever depends on the isolation of *S. typhi* from blood, bone marrow or a specific anatomical lesion. Majority of the patients have normal WBC counts and in 15–25% of cases, leukopenia and neutropenia are detectable. Eosinopenia could give a diagnostic clue.[16] Leukocytosis is more common among children and in cases complicated by intestinal perforation or secondary infection. Other nonspecific laboratory findings include moderately elevated liver transaminases and muscle enzyme levels.

Blood culture is the mainstay of the diagnosis of this disease. More than 80% of patients with typhoid fever have the causative organism in their blood. A failure to isolate the organism may be caused by several factors:

1. The timing of collection, patients with a history of fever for 7 to 10 days are more likely to have a positive blood culture.
2 The volume of the specimen cultured[17]
3. Prior receipt of antibiotics

Bone marrow aspirate culture is the gold standard for the diagnosis of typhoid fever and is particularly valuable for patients who have been previously treated, who have a long history of illness and for whom there has been a negative blood culture.[18] Duodenal aspirate culture has also proved highly satisfactory as a diagnostic test but has not found widespread acceptance because of poor tolerance of duodenal aspiration, particularly in children.[19]

Widal test

This test measures agglutinating antibody levels against O and H antigens. Usually, O antibodies appear on days 6-8 and H antibodies on days 10-12 after the onset of the disease. The test is usually performed on an acute serum. A convalescent serum should preferably also be collected so that paired titrations can be performed. In practice, however, this is often difficult.

The test has only moderate sensitivity and specificity. In areas of endemicity there is often a low background level of antibodies in the normal population. Determining an appropriate cut-off for a positive result can be difficult since it varies between areas and between times in given areas.[20]

False negatives -It can be negative in up to 30% of culture-proven cases of typhoid fever. This may be because of prior antibiotic therapy that has blunted the antibody response.

False positives - *S. typhi* shares O and H antigens with other *Salmonella* serotypes and has cross-reacting epitopes with other Enterobacteriacae, and this can lead to false-positive results. Such results may also occur in other clinical conditions, e.g. malaria, typhus, bacteraemia caused by other organisms, and cirrhosis. Prior typhoid vaccination can also give a false positive result.

Hence, widal test should not be used as a diagnostic test in endemic areas.

New diagnostic tests: current status and usefulness

There is a need for a quick and reliable diagnostic test for typhoid. Recent advances include the IDL Tubex test which reportedly can detect IgM O9 antibodies from patients within a few minutes. Another rapid serological test, Typhidot, takes three hours to perform. It was developed for the detection of specific IgM and IgG antibodies against a 50 kD antigen of *S. typhi*. A newer version of the test, Typhidot-M, was developed to detect specific IgM antibodies only. All these tests require validation before being applied in large scale.

DNA probes and PCR for detection of *S.* Typhi in blood have been developed and appear to be more rapid and sensitive than standard culture but are not yet commercially available and are impractical in many areas where typhoid is endemic.[21]

EVOLUTION OF ANTIBIOTIC RESISTANCE IN TYPHOID

Antimicrobial resistance in developing countries may be promoted by the widespread use of "over-the-counter" antibiotics, immigrant workers, and international travel. Chloramphenicol, ampicillin or amoxicillin and trimethoprim-sulfamethoxazole formerly were widely used for treatment of typhoid. In the 1970s, chloramphenicol-resistant strains emerged in Mexico and the Indian subcontinent.[22] Beginning in 1989, multidrug-resistant strains of *S.* Typhi, with plasmid-encoded resistance to chloramphenicol, ampicillin, and trimethoprim, emerged in the Indian subcontinent, Southeast Asia, the Middle East, and Africa, and resulted in numerous outbreaks with substantial morbidity and mortality.[23]

More recently, chromosomal and plasmid encoded resistance to ciprofloxacin has appeared among *S.* Typhi isolates from the Indian subcontinent, Vietnam, and Tajikistan, associated with the widespread use of ciprofloxacin to control outbreaks of multidrug-resistant *S.* Typhi infection.[24,25] High-level resistance to third-generation cephalosporins has been reported but remains rare.[26] Although multidrug-resistant strains remain common in many areas of Asia, in certain areas sensitive strains have reemerged.

TREATMENT

Fluoroquinolones appear to be the most effective drugs for the treatment of typhoid; especially in areas where quinolone resistance is uncommon.[27] Fluoroquinolones are highly active against *S.* Typhi in vitro and achieve high concentrations in macrophages and in bile. They are rapidly effective, with cure rates of up to 98%, fever resolution in an average of 4 days and lower rates of relapse. They are proven to be safe for the treatment of multidrug-resistant typhoid in children and pregnant women.[28]

When *S. Typhi* strains are relatively quinolone resistant (MIC of ciprofloxacin of 0.125 to 1 ìg/mL), they should be treated with higher doses of ciprofloxacin or ofloxacin (10 mg/kg twice daily) for 10 to 14 days. Patients with *S. Typhi* strains with MIC values of ciprofloxacin of 2 ìg/mL or greater should be treated with a third-generation cephalosporin or azithromycin.[29] Ceftriaxone (1 to 2 g daily in adults or 60 mg/kg daily in children) administered either intravenously or intramuscularly for 10 to 14 days or oral cefixime (15 to 20 mg/kg twice daily for 14 days) results in cure rates of 95%.[30]

First- and second-generation cephalosporins are clinically ineffective and should not be used to treat typhoid fever or nontyphoidal salmonellosis, despite adequate in vitro killing activity. Aminoglycosides also are clinically ineffective, perhaps because they lack activity against intracellular *Salmonella.*When untreated, typhoid fever persists for three weeks to a month. Death occurs in between 10% and 30% of untreated cases.

TREATMENT OF UNCOMPLICATED TYPHOID

	Optimal therapy			Alternative therapy		
Susceptibility	**Antibiotic**	**Daily dose mg/kg**	**Duration**	**Antibiotic**	**Daily dose mg/kg**	**Duration**
Fully sensitive	Ciprofloxacin	15	14	Chloramphenicol	100	14 - 21
				Amoxicillin	100	14
				TMP-SMX	8 - 40	14
Multidrug resistance	Ciprofloxacin	15	14	Ceftriaxone	60	14
Quinolone resistance	Ceftriaxone	60	14	Ciprofloxacin	20	14

TREATMENT OF SEVERE TYPHOID

	Optimal therapy			Alternative therapy		
Susceptibility	**Antibiotic**	**Daily dose mg/kg**	**Duration**	**Antibiotic**	**Daily dose mg/kg**	**Duration**
Fully sensitive	Ciprofloxacin	15	14	Chloramphenicol	100	14 - 21
				Amoxicillin	100	14
				TMP-SMX	8 - 40	14
Multidrug resistance	Ciprofloxacin	15	14	Ceftriaxone	60	14
Quinolone resistance	Ceftriaxone	60	14	Ciprofloxacin	20	14

The use of glucocorticosteroids has been advocated in the treatment of severe typhoid fever based upon a study in Jakarta that showed a significant reduction in mortality among patients with severe typhoid fever (i.e., associated delirium, obtundation, stupor, coma, or shock).[10] Although the study has never been repeated, dexamethasone 3 mg/kg intravenously followed by eight doses of 1 mg/kg every 6 hours should be considered in the treatment of severe typhoid with altered mental status or shock. Steroid treatment beyond 48 hours may increase the relapse rate.[31]

Up to 5 - 10% of patients develop mild relapse, usually within 2 to 3 weeks of fever resolution and associated with the same strain type and susceptibility profile. Reinfection may be distinguished from relapse using molecular typing. [32] A relapse does not imply resistance and treatment is similar to the initial episode.

Prevention

Sanitation and hygiene are the critical measures that can be taken to prevent typhoid. Typhoid does not affect animals and therefore transmission is only from human to human. Typhoid can only spread in environments where human feces or urine are able to come into contact with food or drinking water. Careful food preparation and washing of hands are crucial to preventing typhoid. Public education campaigns encouraging people to wash their hands after defecating and before handling food are an important component in controlling spread of the disease. According to statistics from the United States Centre for Disease Control and Prevention (CDC), the chlorination of drinking water has led to dramatic decreases in the transmission of typhoid fever in the U.S.

There are two vaccines currently recommended by the World Health Organisation for the prevention of typhoid: [33]

1. The live, oral Ty21a vaccine
2. The injectable Typhoid polysaccharide vaccine (sold as *Typhim Vi* by Sanofi Pasteur and *Typherix* by GlaxoSmithKline).

The efficacy is between 50% to 80%. The typhoid vaccines currently available do not offer protection against *S.* Paratyphi infection .The vaccine is recommended for both people living in endemic areas and travelers to areas where typhoid is endemic.

CONCLUSION

1. Typhoid is one of the common causes of community acquired acute undifferentiated febrile illness in our country.
2. Blood culture helps in establishing the diagnosis, Widal test is not reliable.
3. Quinolone resistance is widespread.
4. Ceftriaxone or Azithromycin should be the empiric therapy of choice.
5. Typhoid is a vaccine preventable disease.

REFERENCES

1. Smith T: The hog-cholera group of bacteria. *US Bur Anim Ind Bull* 1894; 6: 6-40.
2. Ivanoff BN, Levine MM, Lambert PH. Vaccination against typhoid fever: present

status. *Bulletin of the World Health Organization* 1994; 72(6): 957-71.

3. Sinha A, Sazawal S, Kumar R, et al: Typhoid fever in children aged less than 5 years. *Lancet* 1999; 354: 734-737.
4. Punjabi NH. Cost evaluation of typhoid fever in Indonesia. *Medical Journal of Indonesia 1998; 7(S): 90-3TR.*
5. Dritz SK, Braff EH: Sexually transmitted typhoid fever. *N Engl J Med* 1977; 296:1359.
6. Weikel CS, Guerrant RL: Nosocomial salmonellosis. *Infect Control* 1985; 6:218-220
7. Maskey AP et al: *Salmonella* enteric serovar Paratyphi A and *S. enterica* serovar Typhi cause indistinguishable clinical syndromes in Kathmandu, Nepal. Clin Infect Dis 42:1247, 2006
8. Butler T, Islam A, Kabir I,Jones PK: Patterns of morbidity and mortality in typhoid fever dependent on age and gender: Review of 552 hospitalized patients with diarrhea. *Rev Infect Dis* 1991; 13:85-90.
9. Stuart BM, Pullen RL: Typhoid: Clinical analysis of three hundred and sixty cases. *Arch Intern Med* 1946; 78:629-661.
10. Hoffman SL, Punjabi NH, Kumala S, et al: Reduction of mortality in chloramphenicol-treated severe typhoid fever by high-dose dexamethasone. *N Engl J Med* 1984; 310:82-88.
11. Verghese A: The "typhoid state" revisited. *Am J Med* 1985; 79:370-372.
12. Parsons R, Gregory J, Palmer DL: Salmonella infections of the abdominal aorta. *Rev Infect Dis* 1983; 5:227-231.
13. Carey J, Buchstein S, Shah S: Septic deep vein thrombosis due to Salmonella johannesburg. *J Infect* 2001; 42:79-80.
14. Nath G, Singh H, Shukla VK: Chronic typhoid carriage and carcinoma of the gallbladder. *Eur J Cancer Prev*1997; 6:557-559.
15. Lanata CF, Levine MM, Ristori C, et al:Vi serology in detection of chronic Salmonella typhi carriers in an endemic area. *Lancet* 1983; 2:441-443.
16. Jog.S: Enteric fever in Mumbai--clinical profile, sensitivity patterns and response to antimicrobials. JAPI 2008 Apr; 56:237-40.
17. Wain J: Quantitation of bacteria in blood of typhoid fever patients and relationship between counts and Clinical features, transmissibility, and antibiotic resistance. *Journal of Clinical Microbiology* 1998;36: 1683-7.
18. Soewandojo E: Comparative results between bone marrow culture and blood culture in the diagnosis of typhoid fever.*Medical Journal of Indonesia* 1998; 7(S1): 209.
19. Benavente L, Gotuzzo J, Guerra O, Grados H, Bravo N. Diagnosis of typhoid fever using a string capsule device. *Transactions of the Royal Society of Tropical Medicine and Hygiene* 1984 ; 78(3): 404-6.
20. Clegg A, Passey M, Omena MK, Karigifa K., Sueve N. Re-evaluation of the Widal agglutination test in response to the changing pattern of typhoid fever in the highlands of Papua New Guinea. *Acta Tropica* 1994; 57(4):255-63
21. Chaudhry R, Laxmi BV, Nisar N, et al: Standardisation of polymerase chain reaction for the detection of Salmonella typhi in typhoid fever. *J Clin Pathol*1997; 50: 437-439.
22. Paniker CK, Vimala KN: Transferable chloramphenicol resistance in Salmonella typhi. *Nature*1972; 239:109-110.
23. Rowe B, Ward LR, Threlfall EJ: Multidrug-resistant Salmonella typhi: A worldwide epidemic. *Clin Infect Dis*1997; 24(Suppl 1):S106-S109.
24. Mermin JH, Villar R, Carpenter J, et al: A massive epidemic of multidrug-resistant typhoid fever in Tajikistan associated with consumption of municipal water. *J Infect Dis* 1999; 179:1416-1422.
25. Wain J, Hoa NT, Chinh NT, et al: Quinolone-resistant Salmonella typhi in Viet Nam: Molecular basis of resistance and clinical response to treatment. *Clin Infect Dis* 1997; 25:1404-1410.
26. Saha SK, Talukder SY, Islam M, Saha S: A highly ceftriaxone-resistant Salmonella typhi in Bangladesh. *Pediatr Infect Dis J* 1999; 18:387.
27. Parry CM, Hien TT, Dougan G, et al: Typhoid fever. *N Engl J Med* 2002; 347:1770-1782
28. Thomsen LL, Paerregaard A: Treatment with ciprofloxacin in children with typhoid fever. *Scand J Infect Dis* 1998; 30:355-357.
29. Threlfall EJ, Ward LR, Skinner JA, et al: Ciprofloxacin-resistant Salmonella typhi

and treatment failure. *Lancet* 1999; 353: 1590-1591.

30. Girgis NI, Tribble DR, Sultan Y, Farid Z: Short course chemotherapy with cefixime in children with multidrug-resistant Salmonella typhi septicaemia. *J Trop Pediatr* 1995; 41:364-365

31. Cooles P: Adjuvant steroids and relapse of typhoid fever.*J Trop Med Hyg* 1986; 89:229-231.

32. Wain J, Hien TT, Connerton P, et al: Molecular typing of multiple-antibiotic-resistant Salmonella enterica serovar Typhi from Vietnam: Application to acute and relapse cases of typhoid fever. *J Clin Microbiol*1999; 37: 2466-2472.

33. "Typhoid vaccines: WHO position paper". *Wkly. Epidemiol. Rec.* 83 (6): 49–59. February 2008.

Central blood pressure lowering and cardiovascular prevention

Vijay Viswanathan*

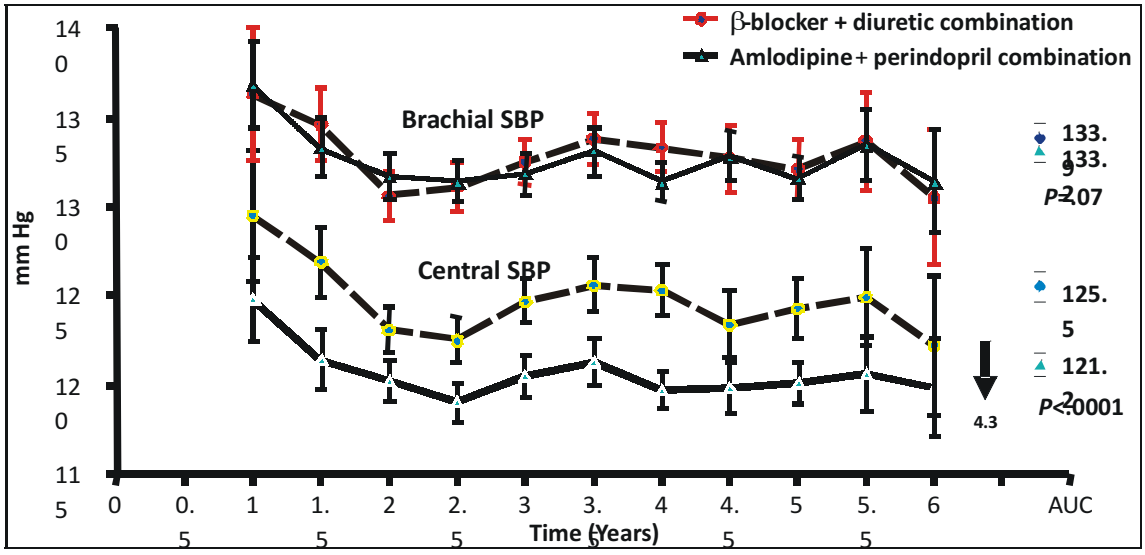
Historically, brachial artery pressure has been the gold-standard surrogate measure of antihypertensive drug efficacy. This reflects the ease with which pressure can be assessed non-invasively in the upper arm and also the wealth of epidemiological data relating brachial blood pressure to future cardiovascular risk. However, blood pressure varies throughout the arterial tree due to differences in vessel stiffness and the influence of wave reflections. Moreover, it is the pressure in the central, not peripheral arteries to which the major organs are exposed. A range of techniques are now available with which to assess central blood pressure and in the recent years there has been a growing awareness of the importance of central blood pressure in the pathogenesis of cardiovascular disease. Indeed, evidence that central pressure is a better predictor of cardiovascular events[1] than peripheral pressure measured conventionally at the brachial artery is now emerging.

A simple non-invasive method to measure the central aortic pressure is applanation tonometry. The system is called sphygmocor which has been approved by USFDA.[2]

Antihypertensive agents differ in their ability to lower central aortic blood pressure, despite similar reduction in brachial BP.[3] Until recently, the consensus view was that blood pressure reduction matters more than the choice of antihypertensive drugs. Fortunately, consideration of changes in central blood pressure helps resolve this apparent paradox.

The Conduit Artery Function Evaluation (CAFÉ) study was the first large-scale prospective randomized trial investigating whether different BP-lowering treatment strategies have different effects on central aortic pressures and thus cardiovascular outcomes despite similar effects on brachial BP.[4]

The CAFÉ investigators assessed central blood pressure in a cohort of 2199 individuals



who participated in the main ASCOT[5] study comparing an atenolol/bendroflumethiazide-based regimen with an amlodipine/perindopril-based one. Despite identical reductions in peripheral blood pressure between the two groups of

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subjects enrolled into the substudy, aortic systolic pressure was some 4.3mmHg lower, and aortic pulse pressure 3.0mmHg lower, in those randomized to the amlodipine-perindopril regimen arm.

Although modest, this differential effect could explain most of the observed difference in outcome in the main ASCOT study.

REFERENCES:

1. Laurent S, Cockroft J, Van Bortel L, Boutouyrie P, Giannattasio C, Hayoz D, Pannier B, Vlachopoulos C, Wilkinson I, Struijker-Boudier H. Expert consensus document on arterial stiffness: methodological issues and clinical applications. *Eur Heart J. 2006;27:2588-2605.*
2. Mechanical Principles in Arterial Disease. Michael O'Rourke. *Hypertension. 1995;26:2-9*.
3. Van Bortel LM, Struijker-Boudier HA, Safar ME. Pulse pressure, arterial stiffness, and drug treatment of hypertension. *Hypertension. 2001;38:914-921*.
4. The CAFÉ investigators. Differential impact of blood pressure-lowering drugs on central aortic pressure and clinical outcomes. Principal results of the Conduit Artery Function Evaluation (CAFÉ) study. *Circulation. 2006;113:1213-1225*.
5. Dahlof B, Sever PS, Poulter NR, et al for the ASCOT investigators. Prevention of cardiovascular events with an antihypertensive regimen of amlodipine adding perindopril as required versus atenolol adding bendroflumethiazide as required, in the Anglo-Scandinavian Cardiac Outcomes Trial-Blood Pressure Lowering Arm (ASCOT-BPLA): a multicentre randomized controlled trial. *Lancet. 2005;366:895-906*.

Case Reports

A Case of PSOAS ABSCESS : Case Report

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ABSTRACT

Psoas muscle abscess is a rare condition with vague clinical presentation, which presents a diagnostic challenge requiring a high index of suspicion. We report a case of psoas abscess in a patient with no co-morbids who presented as undiagnosed fever for three months.

Key words

psoas abscess, pain, fever

INTRODUCTION

Psoas abscess may be classified as primary or secondary, depending on the presence or absence of underlying disease. Primary psoas abscess is a rare clinical entity with subtle and non specific symptoms, most commonly seen in immunosuppressed patients or those predisposed to infections. It has no definite etiology. The psoas muscle has a rich vascular supply that is believed to predispose it to hematogenous spread from sites of occult infection. Psoas abscess can also be secondary to gastrointestinal or renal pathology through direct infection of adjacent structures. The most common causes are appendicitis, diverticulitis, Crohn's disease and carcinoma. The organisms responsible for infection are gram-negative germs (*Escherichia coli, Klebsiella spp., Pseudomonas aeruginosa, Proteus mirabilis Enterobacter spp.)* and gram-positive cocci *(Staphylococcus aureus, Staphylococcus epidermidis, Streptococcus agalactiae,* α*-hemolytic streptococci*, especially *Streptococcus mitis*). It can also be of tuberculous etiology and associated with cold abscesses of lower thoracic and upper lumbar vertebral bodies, as the psoas is attached to these vertebrae. Percutaneous drainage and antibiotics provide an effective and safe alternative to more invasive surgical drainage in most patients. Surgical drainage is associated with shorter hospital stay.

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CASE REPORT

A 50 year old lady with no co-morbids presented to our outpatient department with history of fever for the past three months. Fever was high grade, intermittent, not associated with chills and rigors. She had been extensively investigated in various centres for fever but was not diagnosed. Baseline blood investigations were within normal range and clinical examination did not reveal any localising signs for fever. Mantoux was positive 40 by 30 mm. A routine ultrasound abdomen showed a left retroperitoneal mass encasing the left upper ureter causing left hydronephrosis anterior to left psoas muscle. CT scan revealed a multiseptate hypodense cystic space occupying lesion involving left psoas muscle encasing left ureter causing left hydronephrosis. The patient was referred to a surgeon and the abscess was surgically drained. Histopathological examination showed granulomatous inflammation. He was started on clindamycin and anti tubercular drugs. Subsequently the pus grew tubercle bacilli.

DISCUSSION

Anatomy [1]

The psoas muscle is a retroperitoneal muscle that originates from the lateral borders of the 12th thoracic to fifth lumbar vertebrae and inserts in the lesser trochanter of the femur. In 70% of people, it is a single structure (psoas major), but 30% also have a smaller psoas minor muscle, which lies anterior to the psoas major along the same course. It is innervated by branches of L2, L3, and L4 nerves before the formation of the femoral nerve. The psoas muscle lies in close proximity to many other organs, including the sigmoid colon, jejunum, appendix, ureters, aorta, renal pelvis, pancreas, iliac lymph nodes, and spine. Thus, infections in these o rgans can contiguously spread to the psoas muscle. The psoas muscle has a rich vascular supply that is believed to predispose it to hematogenous spread from sites of occult infection.

Epidemiology [1]

Mynter first described psoas abscess in 1881 refereeing as psoitis. Psoas abscess is a relatively uncommon condition in western countries. Psoas abscess may be classified as primary or secondary, depending on the presence or absence of underlying infection. Primary psoas abscess occurs probably as a result of haematogenous spread of an infectious process from an occult source in the body. Incidence of psoas abscess was 12 cases per year worldwide in 1992. This was a significant increase from the calculated occurrence of 3.9 cases per year before 1985. The increase was attributed to improved diagnosis with the widespread use of computed tomography. Primary psoas abscess is most prevalent in young patients and occurs rarely in the elderly population. Certain groups of immuno-compromised patients, such as diabetics, the elderly, patients on steroids, patients with malignancies, and alcoholics, usually present with infrequent sites of infection. A primary psoas abscess is predominant in developing countries; however, in the western world primary psoas abscess has become more prevalent, especially in immunocompromised patients. This group includes intravenous drug users, HIV-infected persons and patients with chronic illness or malignancies. In a large review the most common cause of secondary psoas abscess was Crohn's disease (60%). Other causes are appendicitis (16%), ulcerative colitis, diverticulitis, colon cancer (together 11%) and vertebral osteomyelitis (10%) [Table 1].

Table 1 PREDISPOSING CONDITIONS

Disease Site	Conditions
Gastrointestinal	Diverticulitis, appendicitis, Crohn's disease, colorectal carcinoma, appendiceal tumor
Genitourinary	Urinary tract infection, extracorporeal shock wave lithotripsy, cancer
Musculoskeletal	Vertebral osteomyelitis, lumbar spondylodiskitis, infectious sacroiliitis, septic arthritis
Other	Endocarditis, femoral artery catheterization, infected abdominal aortic aneurysm, hepatocellular carcinoma, trauma, intrauterine contraceptive device, acupuncture, spinal surgery sepsis, suppurative adenitis, long-term hemodialysis or peritoneal dialysis

Bacteriology [1,3,6]

Staphylococcus Aureus is the causative organism in over 88% of patients with Primary Psoas Abscess, *Streptococcus species* 4.9% and *Escherichia coli* 2.8%. Other rare pathogens reported are *Mycobacterium tuberculosis, Streptococcus species, Escherichia coli, Salmonella enteritidis, Pneumococcal, Pseudomonas aeruginosa, Proteus Mirabilis, Yersinia enterocolitica, Bacteroides, Pasteurella multocida, Klebsiella, Serratia marcescens Mycobacterium kansasii, and Mycobacterium xenopi. Methillicin resistant Staphylococcus aureus* is also known pathogen also known pathogen. In secondary psoas abscess cultures are often mixed, with *E.*

coli and *Bacteroides* spp predominating. Other organisms include enteric pathogens, *Staphylococcus spp* and *Streptococcus spp*.

Diagnosis [1-5]

The classical symptoms of patients with primary psoas abscess are fever, flank or abdominal pain, and limp. Other symptoms may include malaise, weight loss, or presentation with a mass. Physical findings, such as external rotation of the ipsilateral hip, flank tenderness, and fullness of the flank may be seen. Laboratory tests may reveal raised white cell count, anaemia, and elevated erythrocyte sedimentation rate, as with our case, and bacteriological confirmation of microorganism is utmost importance.

Radiographic imaging studies help in diagnosis and may also help in finding an underlying cause. Plain abdominal x-ray may reveal an abnormal psoas shadow or a soft tissue mass. Ultrasound of the abdomen may demonstrate a hypoechoic mass suggestive of psoas abscess, but cannot identify the cause of the abscess. CT scan of the abdomen with contrast is the most efficient and accurate imaging study in diagnosing a PA. CT scanning is now used as the first line of investigation. CT scan of the abdomen not only helps in diagnosis, but also in identification of the etiology, for therapeutic purposes, and postoperative follow-up. CT scan is also valuable in differentiating between tumor , hematoma and abscess of the ilio – psoas compartment.

The most reliable CT features of each condition were as follows: [5]

- Irregular margins 67% sensitive, 52% specific and 57% accurate for neoplasm
- Low attenuation 100% sensitive, 43% specific and 70% accurate for the abscess
- Diffuse involvement of the entire muscle 88% sensitive, 78% specific and 80% accurate for hematoma

Treatment [1,2,4]

An adequate knowledge of the causative organisms should guide the initial choice of antibiotics. But at the same time the importance of bacteriological confirmation of micro organism involved should not be ignored. It has been suggested that in primary psoas abscess, antistaphylococcal antibiotic therapy should be started before final bacteriologic diagnosis . However, the identification of non-staphylococcus organisms in some patients with primary psoas abscess and the identification of staphylococcus in patients with secondary psoas abscess, makes it prudent in all cases of psoas abscess to start treatment with broad spectrum antibiotics like cephalosporins, quinolones, imipenem and clindamycin pending final bacteriologic diagnosis. Antibiotics are sometimes continued up to four to six weeks after complete drainage of the abscess. Drainage can be surgical or radiological. Percutaneous drainage may be difficult in some patients because of the location of the abscess, but whenever possible it should be employed. Even in patients with complex, multiloculated abscesses, percutaneous drainage should be attempted and open surgical drainage should be reserved if percutaneous drainage fails. Patients with secondary psoas abscess require correction of their underlying disease in addition to the drainage procedure. Extra-peritoneal drainage is a safe, effective method of draining these abscesses. Compared to percutaneous drainage, an advantage with open drainage is that debridement of adjacent tissues can be done, which may help in shortening recovery time.

Prognosis [1]

With appropriate treatment the prognosis is generally good. Primary psoas abscess has a better p rognosis, the mortality rate being only 2.4%. Secondary psoas abscess has a mortality rate of 18.9%. The major cause of death is delayed or inadequate therapy. Mortality in un-drained cases approaches 100%, with sepsis being the usual cause of death

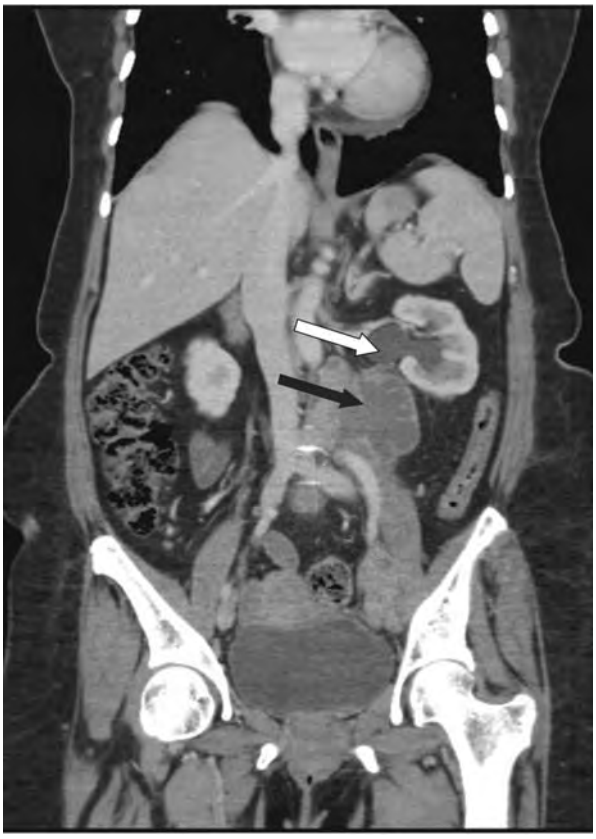

Figure 1 : Axial section of CT Abdomen and Pelvis showing the Psoas Abscess (black arrow) displacing the left kidney with hydronephrosis (white arrow).

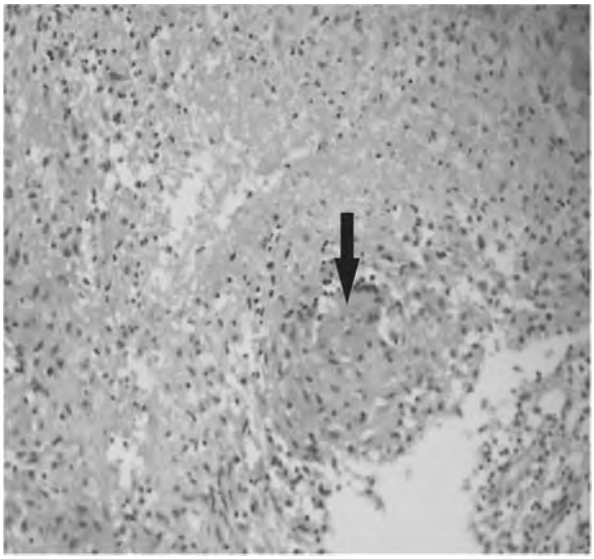

Figure 3 : Photomicrograph showing necrotizing granuloma surrounded by subacute inflammation. (Hematoxylin-Eosin stain, 40x)

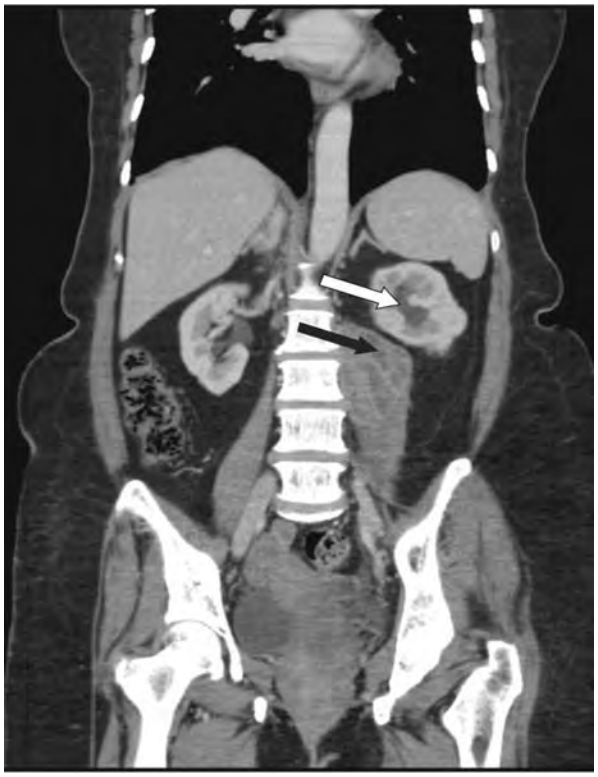

Figure 2 : Axial section of CT Abdomen and Pelvis showing the large Psoas Abscess (black arrow) displacing the left kidney (white arrow).

Conclusion

High index of clinical suspicion is required for the diagnosis of psoas abscess. We also emphasises the importance of imaging techniques as CT scan and bacteriological confirmation of microorganism involved, although *Staphylococcus aureus* remains the commonest pathogen.

References

1. Mohamed Nabil Y M Riyad, Mohamed Alaa Sallam, Ali Nur; **Pyogenic Psoas Abscess: Discussion of its Epidemiology, Etiology, Bacteriology, Diagnosis, Treatment and Prognosis - Case Report, Kuwait Medical Journal 2003, 35 (1): 44-47**
2. M. van den Berge, S. de Marie, T. Kuipers, et al; Psoas abscess: report of series and review of the literature, Netherlands The Journal of Medicine Nov 2005,63(10):413-416
3. Nitin B Bagul, Abeywardana MS Abeysekara and Sabu Jacob; Primary psoas abscess due to Streptococcus milleri, **Annals of Clinical Microbiology and antimicrobials 2008, 7:7**

4. R Malhotra, KD Singh, S Bhan and PK Dave; Primary pyogenic abscess of the psoas muscle, The Journal of Bone and Joint Surgery 1992,74:278-284.

5. Leon Lenchik, Daniel J. Dovgan, **Ruben Kier; CT of the Iliopsoas Compartment: Value in Differentiating Tumor, Abscess and Hematoma , AJR 1994;162:83-86**

6. 1. Gerald L. Mandell, John E. Bennet, Raphael Dolin. Principles and practice of infectious diseases, 6th ed. Philadelphia (PA), Churchill Livingstone, Elsevier, 2005. p.1319

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Listen to the Patient he is Giving us the Diagnosis

S.R.Chandra*, Ranjith Sanu Watson, Vivek Purvshothaman, C.S.Vidhya Annapoorni

ABSTRACT

Three patients with neurological symptoms who received treatment based on laboratory data with little regard to clinical history is discussed.

Tumors and tumefactive demyelination are a challenge to Radiologist, Pathologist and Surgeon as they share several common features. Correlation with clinical onset and evaluation of laboratory data in the light of clinical history will only clinch the diagnosis and help to avoid potentially harmful treatments. A third case of incidentaloma being implicated as causal in a patient who in fact had a non epileptic attack disorder of psychological origin and responded to Psychotherapy and not surgery.

LISTEN TO THE PATIENT HE IS GIVING US THE DIAGNOSIS

Introduction

Unlike any other system nervous system is spread all over the body so that it controls the function of every other system. So disorders of nervous system can present with neuro-psychiatric symptoms, hemispheric symptoms restricted or global, symptoms of various sub-cortical, brainstem, spinal cord or lower motor neurons. More over as nervous system is the master system controlling other systems, it can present with symptoms referable to other systems also. Investigations done without proper and thorough clinical history can result in a situation where the investigator targets soft innocuous lesion that are incidental causing great therapeutic errors. With more and more technological advances, this is more and more relevant because these are very sensitive techniques and pick up shadows, which need careful assessment. Here we report the history of three such cases.

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Case I

Nine-year-old female child studying in 4th standard reported to neurology department, Trivandrum in the year 2006 with the following history. She was born to non-consanguineous parents and was doing well till August 15, 2005. She developed sudden onset dragging of left leg, which steadily worsened over the next one week. She was seen by pediatrician on August 22 and investigated with CT scan head. It showed an irregular hypo dense leision in the right parieto occipital area with minimal contrast

Enhancement and no mass effect. The possibility suggested by radiologist was glioma. She underwent MRI scan which was reported as ill defined intra axial lesion hypodense in T1 and heterogeneously hyperintense in T2 and flair, images involving right parieto occipital white matter, extending to splenium of corpus callosum and crossing the mid line. Lesion measured 6x 6 x 5 cms on contrast with peripheral rim enhancement seen with central non-enhancing cystic necrotic area suggestive of anaplastic astrocytoma (fig (1) fig (2)). Based on this she underwent surgery on 3rd September 2005. The operation notes were as follows. Duratense brain

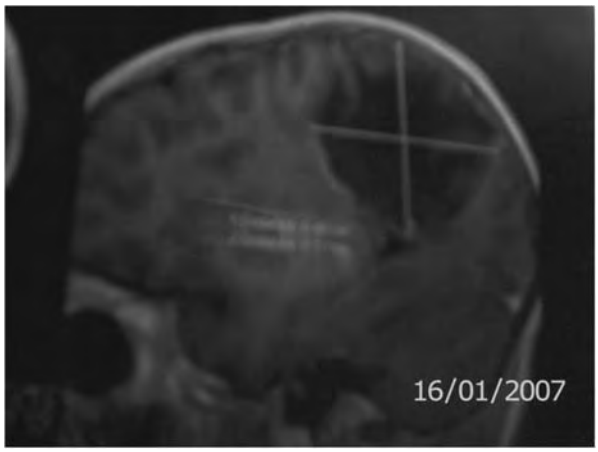

Figure 1 cystic lesion

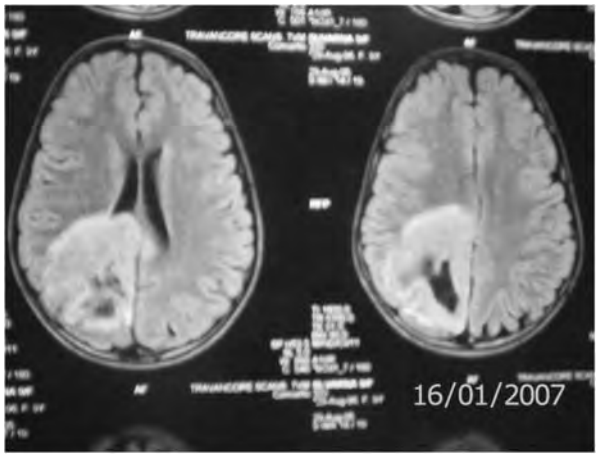

Figure 2 enhancing ring

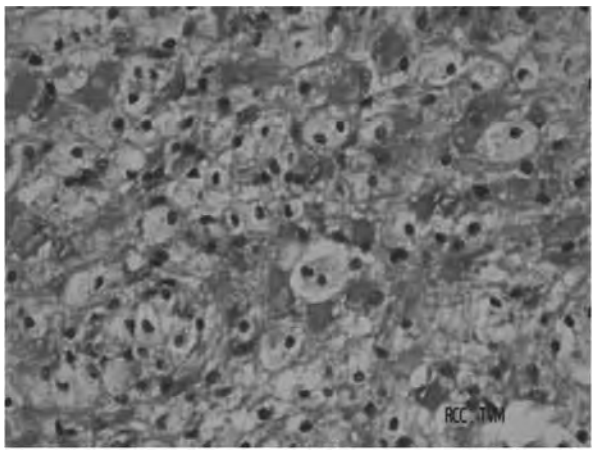

Figure 3 eosinophilic cytoplasm eccentric nucleus s/o gemistocytes

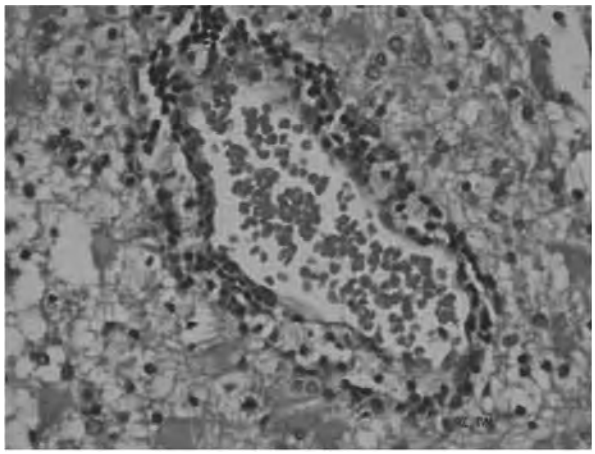

Figure 4 perivascular cuffing

surface normal. AT one-centimeter depth yellowish grey hypovascular firm to soft tumor seen infiltrating the surrounding brain diffusely there was no clear demarcation or encapsulation. Adequate decompression done. Postoperative period uneventful. Histopathology report showed brain tissue with moderately cellular neoplasm composed of astrocytes with eccentrically placed nucleus and abundant eosinophilic cytoplasm and areas of perivascular lymphocytic cuffing is seen (fig 3,4,5). These pictures are consistent with gemistocytic astrocytoma. The slides were reassessed and reported as oligoastrocytoma and patient underwent thirty-three cycles of irradiation starting on 15th November 2005. Patient had worsening of left hemiparesis at that time and evaluated with CT Scan which showed oedema and was treated with antioedema measures by neurosurgeon. (Figure (6)) CT Scan

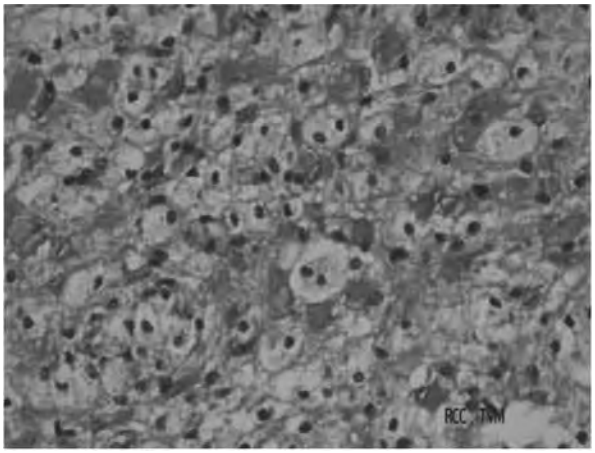

Figure 5 increased cellularity

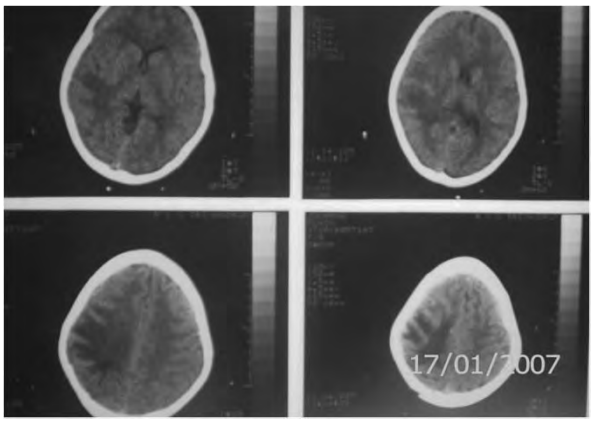

Figure 6 edema

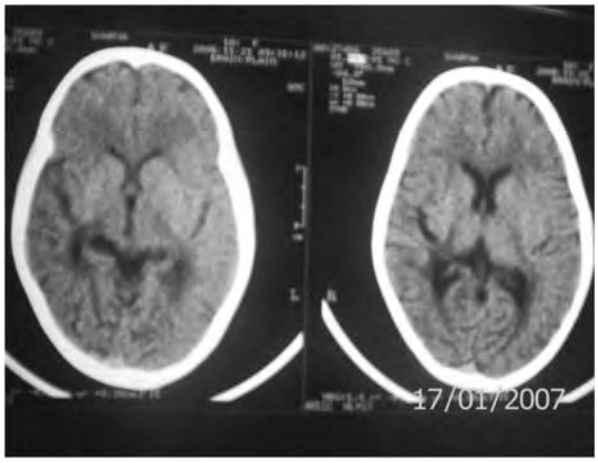

Figure 7 resolution of edema

repeated one week later showed resolution of oedema (figure(7)). November 2006 patient developed dysarthria, dysphasia and difficulty in walking. Her optic-fundus was normal. She had bilateral facial weakness with sparing of emotions. Tongue was spastic palate was moving sluggishly and had bilateral pyramidal signs. This was her first visit to neuromedicine department. Possibilities considered were recurrence of glioma Vs radiation induced demyelination.

MRI brain was repeated during this visit in 2006 and it showed gliotic right peritrigonal and posterior high parietal region leision with focal atrophy, the post contrast images showed incomplete open ring enhancement of left middle frontal gyrus with diffuse white matter hyper intensities involving periventricular and sub cortical white matter seen over both fronto parietal regions (Figure 8). The histopathology slides were reassessed. The slides were stained with luxal fast blue for myelin. There was loss of myelin with preserved Axons in the white matter. There was perivascular astrocytic proliferation and now the opinion was demyelination (figure 9,10) the child's diagnosis was revised as recurrent tumefactive demyelination and treated with methyl prednisolone for five days and followed up with oral steroids. She recovered very well and returned to school by four weeks she was left with residual left hemi paresis and she continues to be on follow up. This case indicates that demyelination can radiologically and

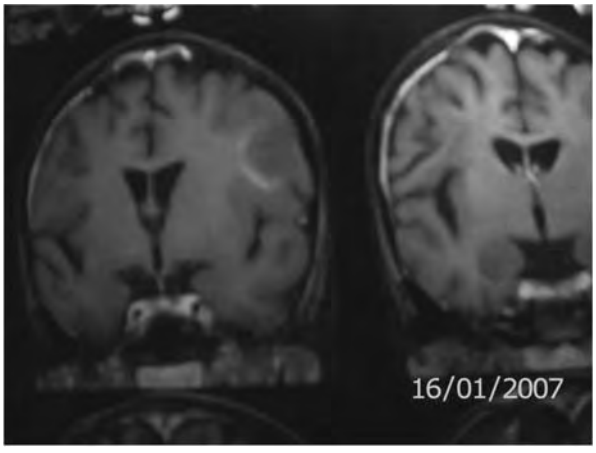

Figure 8 incomplete open ring

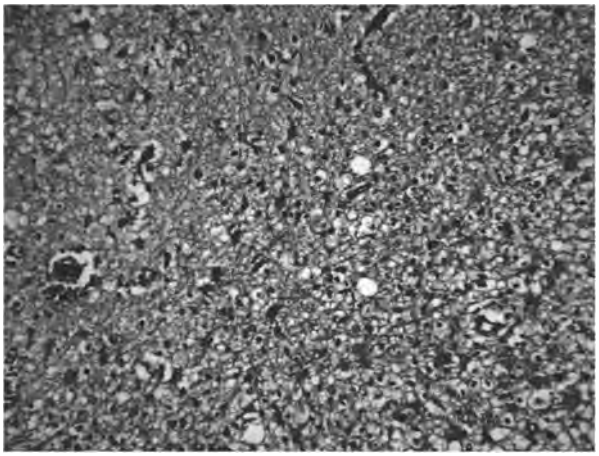

Figure 9 demyelination

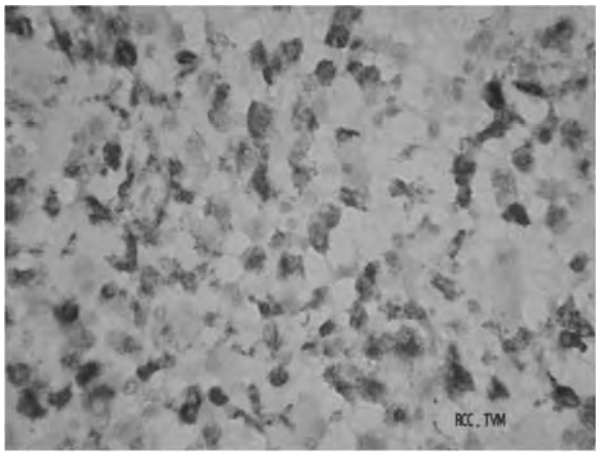

Figure 10 inflammatory cell proliferation

histopathologically resemble neoplasm and unless carefully correlated with clinical course and assessed only in the light of clinical picture the patient may be wrongly subjected to serious management strategies like radiation and surgery which are contraindicated in the above condition.

CASE II

A forty years old politician reported to out patient department of government medical college hospital neuro medicine department with slurred speech as his first symptom of illness and possibility of a lacunar stroke was considered. He was investigated for all risk factors. CT head done at that time was normal hence patient was started on anti platelet agents, as outpatient. However patient experienced deterioration and shifted to a higher centre on the third day of illness MRI done showed T2 hyper intensities confined to white matter with moderate enhancement with contrast. And there was mild involvement of carpus callosum hence infiltrating lesions like lymphoma was considered at that centre and steriotactic biopsy was attempted thrice and failed. Hence he shifted to another center where successful biopsy was done. Patient reported back with diagnosis of astrocytoma to the second center and was subjected to radiotherapy on the eighth day of his illness. He steadily deteriorated and succumbed in the third week of his illness. We could not acquire any of his images or histopathology material for the current presentation even though they were all personally verified by a team of neurologist later as the patient got discharged against medical advice from our institute the same is not available for publication now.

The learning from this case is that corpus callosum and white matter leisions which are mildly enhancing with contrast are seen with demyelinating diseases which are medically treatable. However radiology and histology can be misleading if not correlated clinically and can result fatally if managed with wrong treatment options purely based on laboratory data without clinical picture.

CASE III

Thirty years old female presented with history of recurrent attacks of loss of consciousness of three months duration she gave definite history of stress preceding the same. Semiology of the attacks was as follows sudden falls preceded by call for help, her eyes remain closed with spitting of saliva. She had no tongue injury or incontinence she was having out off phase movements involving all four limbs. The attacks lost about thirty minutes and stop when water is sprinkled, she was not showing any postictal confusion or vomiting she was investigated elsewhere with a CT scan and she was found to have a well defined lesion in the right parietal region (figure 11) with no mass effect or oedema. She was referred to the surgeon and underwent excision (figure 12) however she continued to have these attacks and hence she was referred to neuro-medicine department and her interictal EEG was normal. Her attacks. were witnessed and found to be non epileptic she recovered completely with the help of psychiatrist. The patient had psychogenic seizures, the best investigative tool for that is witnessing the attack by a trained neurologist or a careful description of semiology by an intelligent eye witness. In this case the patient

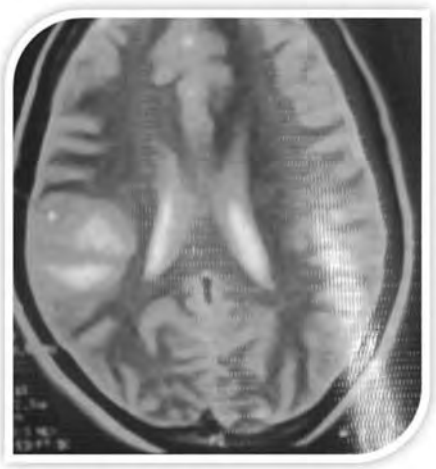

Figure 11 heterotopia right parietal

Figure 12 patient 3

was operated based on a benign congenital lesion seen in the imagings which had no contributory role for the patients symptoms.

Discussion

Patients one and two both had a brief rapidly progressive illness. None of them had features of raised intracranial tension. Image characteristics when reassessed the lesions involved periventricular white matter and carpus collosum, mass effect was minimal. Contrast enhancement was very minimal, patient one also showed the open ring sign.

Histologically presence of evidence of tissue necrosis and gemistocytes are nonspecific unless correlated with clinical and radiological picture. Special stains were not considered in the first instance, as the information provided to the pathologist was with reference to radiological diagnosis reported and not correlated clinicoradiologically.

Tumefactive demyelination is a challenge for the Neurosurgeon, Pathologist and Radiologist.

The lesions presents with varying combinations of headache, seizures and focal neurological deficit.Often supratentorial solitary leisions of more than 20 mm size is seen. No past history of Multiple Sclerosis, vaccinations or infections is found. (1)Mostly monophasic and occasionally relapsing could be intermediate disorder between Multiple sclerosis and acute disseminated encephalomyelitis. (2)Radiologically the features are as follows.

They are seen as solitary leisions predominantly involving white matter with or without involvement of grey matter. Prefers supratentorial compartment and shows very little oedema.(1)Contrast shows incomplete ring enhancement open towards cortical grey matter. The enhancing edge represents the leading edge of demyelination and this favours the white matter side(4). Faint central enhancement due to dilated venous structures occurs which is often the cause for confusion with neoplasm. Apparent diffusion coefficient will show increased diffusion within the leision. Spectroscopy consisting of elevated choline, suppressed NAA, detectable levels of lipid and lactate due to necrosis. Magnetization transfer values are indistinguishable from tumours. Mean relative cerebral blood within the leisions is lower compared to gliomas and lymphomas(3). Hence magnetization transfer and mild contrast enhancement should be considered as soft radiological signs in the contest of a rapidly progressive neurological illness of hours to days. Histologically demyelination shows foamy macrophages intermingled with reactive astrocytes. Varying degrees of myelin loss is seen in axons. (5) Gemistocytic astrocyte is a plump astrocyte which results from injury to nervous tissue. Hence accepted criteria for gemistocytic astroctoma needs more than 20% gemistocytes. More specific features of tumour are dense glial cell proliferation with astrocytic differentiation,moderate nuclear pleomorphism, microvascular proliferation and pseudopalisading necrosis. Immunohistochemical stain will show m16-1 in tumor cell nuclei indicating high proliferation rate.(6) Careful history taking often reveals a acute onset illness with rapid progression which when carefully correlated with open ring enhancement with sparse mass effect and histology showing inflammatory demyelination with or without less than 20% gemistocytes will lead to correct diagnosis. Once diagnosed good response to steroids is observed and recurrence is relatively rare.

Patient III is a clear indication to remember that many patients have asymptomatic incidentalomas which often do not have a causal relationship to the patients problem. Hence for efficient healthcare delivery there is no substitute for thorugh clinical evaluation.

Conclusion

Thorough clinical history obtained from a reliable informant is mandatory in all patients with a neurological symptom. All investigations should be planned only in the light of the history and examination and approach to diagnosis and treatment should be always a team work.

REFERENCES

1. Dagher AP, Smirniotopoulos J, tumefactive demyelinating leisions – Neuroradiology, 1996, 38:560-565 (Medline)
2. Kepes J.J.,Large focal tumor-like leisions of the brain: Intermediate entity between Multiple sclerosis and Acute disseminated encephalomyelitis? A study vof 31 patients.annals of neurology-1993; 33:18-27(Medline)
3. Curtis A Given II, B.Scott Stevens, Charles Lee- The MRI appearences of Tumefactive demyelinating leisions; American Roentgen Ray Society- 2004;182:195-199.
4. HeJ, Grossman RI, Gey, Mannan LJ, Enhancing patterns in multiple sclerosis: evolution and persistence, American Journal of NeuroRadiology -2001;22:664-669.
5. Palcy RJ,PersingJa, DoctorA,etal, Multiple sclerosis and brain tumor: A diagnostic challenge,J Emerg. Medicine1989;7:241-244
6. KarenL.Finkand Elisabeth J. Rushing, Neurooncology, Atlas of clinical Neurology, Third edition, Chapter8:302-303.

An Interesting Case of Early Onset of Cerebral Edema During Diabetic Ketoacidosis Treatment - A Case Report

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ABSTRACT

A young girl with type 1 diabetes presented with diabetic ketoacidosis due to missing of insulin following a respiratory tract infection. Within the first hour of starting intravenous fluids and insulin she developed cerebral edema. This case is being reported because of the unusual presentation of early onset of cerebral edema in the management of DKA and to emphasize the importance of recognizing this complication early as it helped to save this patient.

KEY WORDS

Cerebral Edema, Diabetic Ketoacidosis, Type 1 Diabetes, Asian Indians, South Asians

CASE REPORT

An eleven year old girl, a known case of type 1 diabetes of one year duration was admitted in the emergency department in a tachypenic state. She had missed her insulin injections for two days following a respiratory tract infection. She was diagnosed to have Diabetic Ketoacidosis (DKA) based on Investigations which revealed very high blood sugars, elevated serum and urinary ketones with a high HbA1c. Arterial Blood Gas analysis revealed uncompensated severe metabolic acidosis (PH – 7.183, PCO_2 – 9.2, PO_2 – 122.9, HCO_3 – 3.4). There was also evidence of hyponatremia and hyperkalemia, C-peptide showed absence of pancreatic beta cell reserve (Fasting: < 0.3pmol/ml, Stimulated: < 0.3 pmol/ml) and Glutamic Acid Decarboxylase antibody was positive (> 150 IU/ml).

She was treated with antibiotics as per institutional protocol. She was started on Intra venous fluids with normal saline (according to her body weight) along with IV insulin infusion. 500 ml of NS was transfused in the first hour. Immediately after this she developed intense headache and it got worsened with continuing iv infusion.She also had a bout of vomiting and her B.P shot up to 150/100 mmHg. A clinical diagnosis of cerebral edema was made and she was given 75 ml of iv mannitol over 20 minutes. With this her headache subsided dramatically and her B.P came down to 130/82 mm Hg. She improved after 8 hours of aggressive treatment and made a total recovery.

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DISCUSSION:

We report on a rare case of cerebral edema that set in immediately after starting therapy for DKA. DKA in children may be associated with cerebral edema. Although uncommon (~ 1%),this complication is associated with a high mortality rate (about 25%) and neurological complications[1]. It is known that over-aggressive rehydration (especially with relatively hypotonic fluids) can cause cerebral edema but there is little or no evidence to support this theory[2]. In the face of extracellular hypertonicity, brain cells undergo complex metabolic changes. "Idiogenic osmoles" are produced in the brain to limit brain cell shrinkage[3]. There is increased intracellular production of osmotically active substances such as myoinositol and taurine. It seems logical that

rapidly administered hypotonic fluid will rush into brain cells and result in cerebral edema.However, in experimental animals, aggressive insulin therapy is more likely to be associated with cerebral edema than aggressive fluid therapy[4,5]. While soda bicarbonate would lower the ECF H + concentration, this should only become important for Na+ entry into brain cells when their NHE (Na +/ H + exchanger) is activated. If this is true, a combination of a bolus of insulin together with NaHCO3 and administration of both early in time could make this "trio" become important risk factors for cerebral edema. In contrast, if insulin and NaHCO3 were administered later when the Blood brain barrier is more intact, they might be less likely to cause cerebral oedema[6].

Cerebral edema is the most common cause of mortality and morbidity during the first day of conventional treatment for diabetic ketoacidosis in paediatric patients. It is possible that therapy contributes to its development[7,8]. Risk factors that predispose to cerebral edema should lead to an expansion of the intracellular and/or the extracellular fluid compartment(s) of the brain because water normally accounts for close to 80% of the brain weight. With respect to the intracellular fluid compartment, the driving force to cause cell swelling is a gain of effective osmoles in brain cells and/or a significant decline in the effective osmolality of the expansion of the intracerebral extracellular fluid compartment [9,10]. Factors leading to an expansion of the intracerebral extracellular fluid volume can be predicted from starling forces acting at the blood-brain barrier [11]. It is implied that current fluid and electrolyte management might contribute to the development of cerebral edema [12,13]. Part of the reason for this is that clinicians do not have good data to predict how large the deficits of sodium,potassium and water are likely to be in this population because they can be quite variable in individual patients [14,15].

Thus maybe cerebral edema is a potentially devastating complication that occurs in the first day of therapy for DKA. It is commonly seen 5-15 hours after therapy. It is not known to set in within the first one hour of starting therapy for DKA and this is the first such report to our knowledge.

CONCLUSION

Cerebral edema is a relatively uncommon complication following fluid replacement. This case report emphasises the point that cerebral edema can occur as early as within an hour after starting treatment for DKA. Fluid replacement must therefore be given very cautiously. A high index of suspicion can help make a clinical diagnosis of cerebral edema at an early stage and can save the patient as in this case.

REFRENCES:

1. Rosenbloom AL, Riley WJ, Weber FT, Malone JI, Donnelly WH. Cerebral edema complicating diabetic ketoacidosis in childhood. J Pediatr. 1980; 96:357-61.
2. Edge JA. Cerebral oedema during treatment of diabetic ketoacidosis: are we any nearer finding a cause? Diabetes Metab Res Rev 2000; 16:316-324.
3. Arieff AI, Kleeman CR. Studies on mechanisms of cerebral edema in diabetic comas. Effects of hyperglycemia and rapid lowering of plasma glucose in normal rabbits. J Clin Invest. 1973; 52:571-583.
4. Glaser N, Barnett P, McCaslin I: Risk Factors for Cerebral Edema in Children with Diabetic Ketoacidosis. NEJM 2001; 344: 264-269.
5. Krane EJ, Rockoff MA, Wallman JK, Wolfsdorf JI. Subclinical brain swelling in children during treatment of diabetic ketoacidosis. N Engl J Med 1985; 312: 1147-1151.
6. Asuvattakul S, Warner LC, Halperin ML. Quantitative role of the intracellular bicarbonate buffer system in response to an acute acid load. Am J Physiol 1992; 262: R305-R309.
7. Edge JA. Cerebral oedema during treatment of diabetic ketoacidosis: are we any nearer finding a cause? Diabetes Metab Res Rev 2000;16:316-324.
8. Glaser N, Barnett P, McCaslin I, et al. Risk factors for cerebral edema in children with

diabetic ketoacidosis. N Engl J Med 2001; 344: 264-269.

9. Moore RD. Stimulation of Na:H exchange by insulin. Biophys J. 1981; 33: 203-210.
10. Van der Meulen JA, Klip A, Grinstein S. Possible mechanism for cerebral oedema in diabetic ketoacidosis. Lancet 1987; (ii): 306-308.
11. Arieff AI. Cerebral edema complicating nonketotic hyperosmolar coma. Miner Electrolyte Metab. 1986; 12: 383-389.
12. Inward CD, Chambers TL. Fluid management in diabetic ketoacidosis. Arch Dis Child 2002; 86: 443-444.
13. Edge J. Fluid management in diabetic ketoacidosis. Arch Dis Child 2002; 86: 444-445.
14. Rosenbloom AL. Intracerebral crises during treatment of diabetic ketoacidosis. Diabetes Care 1990; 13: 22-33.
15. Carlotti APCP, Bohn D, Halperin ML. Factors predisposing to cerebral edema (CE) in children presenting with a severe degree of diabetic ketoacidosis (DKA). J Am Soc Nephrol 1999; 10: 121A.

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Toxicology clinics-bench to bed side
Rodenticide poisoning : An Update

S.SenthilKumaran[1], N.Balamurugan[2], V.Karthikeyan[3]

Rodenticides are a category of pest control chemicals intended to kill rodents. These are heterogeneous group of compounds that exhibit markedly different toxicities in humans and rodents. They are among the most toxic substances kept at homes. Patients with rodenticides poisoning present with a spectrum of manifestations ranging from gastrointestinal symptoms to severe bleeding manifestations. In this context let us learn more about rodenticides.

What are the types of rodenticides available in the market?

Rodenticides are broadly classified into *non anticoagulant and anticoagulant compounds*.

Table 1: Non Anticoagulant compounds: nature and toxicity

Nature of the compound	Nature of toxicity
• Arsenic • Barium carbonate • Strychnine • Thallium sulphate • OPC • Yellow phosphorous • Zinc phosphide • Aluminium phosphide • Vacor	Highly toxicity
• A- Naphthalurea • Cholecalciferol	Moderate toxicity

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Table 2: Anticoagulant compound derivatives and generic name

Derivative	Generic name
Coumarin derivatives	• First generation: warfarin
	• Second generation: Brodifacoum, Coumuforyl, Difenacaum
Indandiones	• Diphacinone, chloropacinone

What are the clinical features of rodenticide poisoning?

The signs & symptoms depends on the **type of compound**.

- ***Anticoagulant*** rodenticides are toxic to virtually every organ /system in the body and the signs and symptoms may vary from asymptomatic to active bleeding.

The important clinical and laboratory manifestations of other ***non anticoagulant*** rodenticides are as follows:

- Arsenic – Cardiovascular collapse
- Barium carbonate - Hypokalemia, hypotonia and paralysis
- Strychnine - Muscular spasms, twitches, hypersensitivity to stimuli and convulsions
- Thallium sulfate – Polyneuritis, alopecia, alteration in blood pressure
- Organophosphate compounds – 'SLUDGE [Salivation, lacrimation, urination , defecation, gastrointestinal upset and Emesis,
- Yellow phosphorous - Oral Burns, abdominal pain, GI bleed& "Smoking" luminescent stool
- Zinc or Aluminium phosphide - Acidosis, cardiovascular collapse, wide spread cellular toxicity
- Vacor- Hyperglycemia, ketosis and neuropathies

- Cholecalciferol - Hypercalcemia, osteomalacia and calcifications
- Red Squill - Digoxin-like activity
- Bromethalin – Neurotoxic & Uncouple oxidative phosphorylation
- Norbormide - vasoconstriction with ischemia
- Super warfarin -asymptomatic to active bleeding manifestation

What is super warfarin?

The evolution of the warfarin resistance in rats has resulted in the development of a new class of rodenticides that are long-acting and more potent. These second-generation anticoagulant rodenticides are known as Super warfarin. They have no role in human therapeutic anticoagulation.

Which superwarfarin compound is used commonly?

Brodifacoum is the most common active ingredient in commercially available rodenticides usually found in a 0.005% concentration. It is used in agricultural and urban settings for rodent control and available in the forms such as solid, granular and pellet bais.

How does it act?

It acts by blocking the activation of vitamin K. When vitamin K is not regenerated, the clotting factors II, VII, IX and X cannot be activated (extrinsic pathway) and coagulopathy develops.

How it presents?

The clinical manifestations after ingestion range from being asymptomatic to active bleeding such as hematuria, vaginal bleeding, hematemesis, melaena, soft tissue bruising, epistaxis, haemoptysis, hemarthrosis, retroperitoneal and intracranial haemorrhage. The coagulopathy may last weeks to months and can be associated with significant overall blood loss. Toxic hepatitis has been reported after 3 to 4 days even with single exposure.

What are the Laboratory investigations to be done?

Most patients seek medical attention many days after ingestion with evidence of coagulopathy. **In the acute phase**, the INR and PT should be reassessed every 6 hours and repeated if prolongation is observed until the level plateaus. In suspected long-acting anticoagulation overdose, twice-daily INR evaluation for 2 days is essential to identify most patients at risk of coagulopathy. Assessment of glycemic status, electrolytes, liver function test and arterial blood gas analysis are warranted depending on the clinical picture. The presence of superwarfarin can be estimated by special blood assays.

Can we employ gastric lavage?

Gastric decontamination can be employed with in 6 hours in cases of rodenticide poisoning but gastric lavage with water is contraindicated in case of phosphide compound poisoning. Recent literature suggest that gastric lavage with coconut oil in such cases prevent the release of phosphine gas.

Is there any role of activated charcoal in rodenticide poisoning?

Even though convincing data on the efficacy of either single or multiple-dose activated charcoal (AC) are lacking, at least a single dose may be administered unless contraindicated.

What is the role of blood transfusion in rodenticide poisoning?

In the case of haemorrhagic shock, active bleeding, impaired oxygen transport or emergency surgery, blood transfusion with fresh whole blood is indicated, as it contains both cellular components and coagulation factors. Fresh frozen plasma is used in life-threatening coagulopathy secondary to super warfarin toxicity as it immediately reverts by replacing active vitamin K-dependent coagulation factors.

What is the antidote for superwarfarin poisoning?

Vitamin K_1 (phytonadione) is the specific antidote for super warfarin poisoning. It helps in the hepatic synthesis of coagulation factors II, VII, IX, and X. Vitamin K_2 **(menaquinone) or Vitamin** K_3 **(menadione) are not effective and reliance on treatment with these or their analogues can lead to serious consequences.**

Which is the preferred route?

Vitamin K_1 is available in several formulations such as oral, subcutaneous, intramuscular or intravenous. In superwarfarin poisoning intravenous injection of Vitamin K_1 is preferred, as it produces immediate response, but there is a risk of non-allergic, non-IgE mediated anaphylaxis. Early oral therapy is equally effective in patients with symptomatic coagulopathy and who is not on activated charcoal. Subcutaneous vitamin K_1 should be avoided as its absorption is unpredictable. Likewise, intramuscular vitamin K_1 may be discouraged as it may cause intramuscular haemorrhage.

How to give intravenous vitamin K_1?

Vitamin K_1 Injection (Phytonadione Injectable Emulsion, USP) is supplied as 1 ml ampoule at the concentration of 10 mg/ml. The required dose may be diluted with 100 ml of 0.9% sodium chloride injection or 5% dextrose injection and it's infused over 30 to 60 minutes, not exceeding 1 mg per minute.

What are the adverse reactions of parental administration of vitamin K_1?

Rarely, intravenous administration of vitamin K can produce severe, shock-like reactions. Deaths have been reported after intravenous and intramuscular administration. These reactions are generally as a result of too rapid administration (> 1 mg/minute).

What is the optimum dose of vitamin K_1?

A starting dose of 100 mgs of vitamin K_1 may be given per day in four divided doses. The optimal dosage regimen thereafter remains unclear but should be titrated to correct the INR. The daily vitamin K dose required may be up to 600 mg depending on the severity of coagulopathy. The doses should aim to return INR to therapeutic, not normal concentrations.

How long vitamin K_1 is needed?

Vitamin K_1 should be administered continuously at high doses and for prolonged periods of time; for example 100 mg daily for many days, weeks, and even months. This can vary from 2 months to a year depending on the half life of the compound ingested and the severity.Initially parenteral vitamin K_1 is often indicated, and oral route may be preferred if long-term administration is required.

Is there any role on prophylactic vitamin K_1?

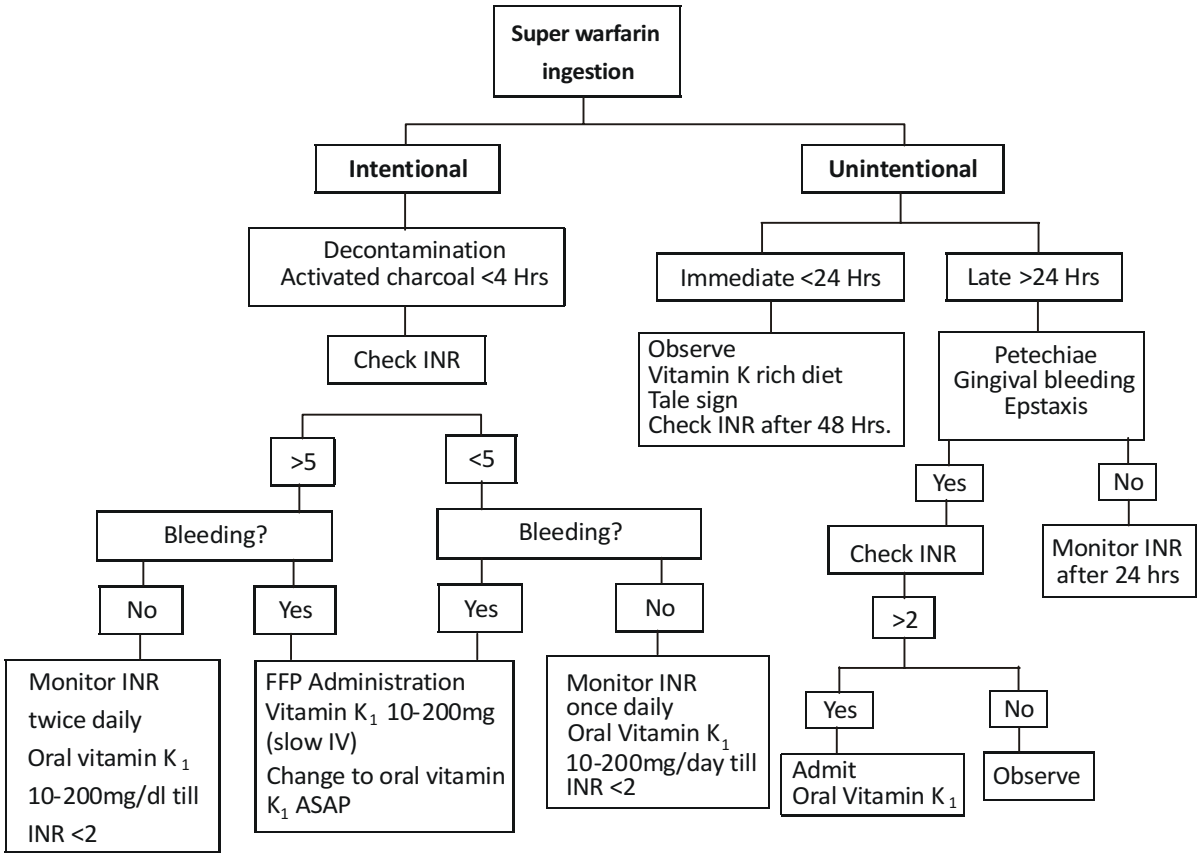
The administration of prophylactic vitamin K_1 in an asymptomatic patient immediately after exposure to super warfarin with no laboratory evidence of coagulopathy is not indicated, as this may mask the onset of anticoagulant effects in the few patients who do require prolonged treatment and follow-up care.

What to do in case of unintentional single ingestions of super warfarin?

It is often seen in children who ingest a small dose of a warfarin-based rodenticide, INR prolongation is unusual. A diet rich in vitamin K such as spinach, sprouts and broccoli may be encouraged.

Sum up:

- Remember that rodenticide compounds are variable and hence, make sure of the compound before you treat.
- Obtain a baseline PT/INR and arrange for repeated measurement
- Administer high dose of **vitamin K_1** for a prolonged period



- Observe allergic reactions while administering **vitamin K_1**
- Lack of data on transfer of superwarfarin compounds across the placenta or excretion in breast milk
- Treat any co-ingestions and/or comorbid illnesses, if any
- Avoid drugs that may enhance bleeding or decrease metabolism of the anticoagulant
- Treat serious hemorrhage with FFP
- use recombinant factor VIIa (rFVIIa) or prothrombin complex concentrate (PCC) if available
- Evaluate the patient for suicidal intention

References:

1. Flomenbaum, Neal E.; Gold frank, Lewis R.; Hoffman Pesticides: An Overview with a focus on Principles and rodenticide. Gold frank (Ed). Text Book of toxicological emergencies, 8th edition. McGraw-Hill, 2006; 1470-1479.
2. Senthilkumaran.S. Toxicity due to Anticoagulants. Suresh David (Ed). Text Book of Emergency medicine, 1st edition. Lippincott Williams & Wilkins (In Press)

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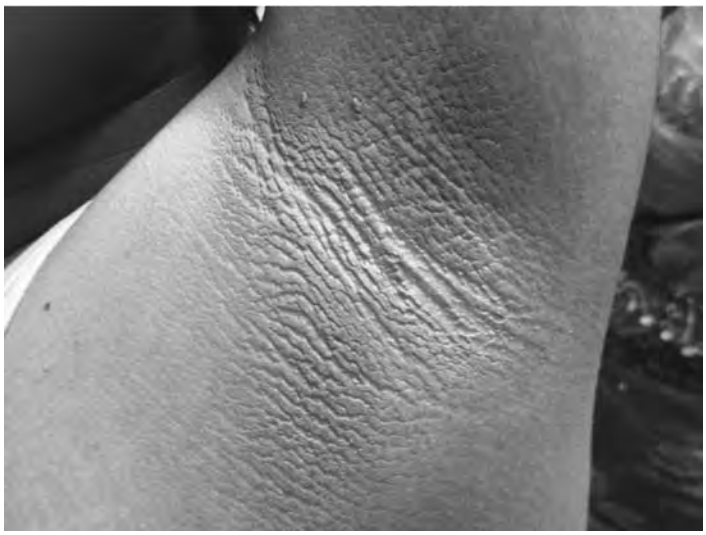
Dermatology Photo Feature

Jayakar Thomas*



This 15-year-old obese boy was seen with velvety dark discoloured plaque over the axillae. The lesions were asymptomatic and were present for the past two years (see image).

DIAGNOSIS

Acanthosis nigricans

Definition/ Description

Acanthosis nigricans (AN) is a disorder that may begin at any age. It causes velvety, light-brown-to-black, markings usually on the neck, under the arms or in the groin. Acanthosis nigricans is most often associated with obesity. AN is sometimes known as a paraneoplastic phenomenon, but this is very rare; much more commonly, AN occurs in relation to endocrine disease. It can also occur as an idiopathic or hereditary disorder.

Clinical picture/Investigations

The clinical features are coffee-colored or gray-brown velvety and papillomatous thickening of the skin around the nape of the neck, axillae (see Image), antecubital fossae, and groin. In the malignant type, palms, soles, and oral and ocular mucosae are also often involved; this should be suspected in older patients with weight loss, whereas the insulin-resistant patients are most often either young or the obese elderly. The endocrine associations have been grouped together under the term HAIR-AN (hyperandrogenism, insulin resistance, AN). Insulin resistance leads to chronic hyperinsulinemia, which in turn stimulates increased ovarian production of testosterone and also has growth-promoting effects on fibroblasts and keratinocytes to produce the clinical features.

Insulin resistance may occur as primary and secondary forms; it is common in obesity, which explains AN in this context. The primary types have been divided into type A (young patients with severe AN and hyperandrogenism, who have decreased numbers or function of insulin receptors) and type B (older women with less severe AN, who have blocking autoantibodies that bind to the insulin receptors).

Other causes of hyperandrogenism, such as polycystic ovary, ovarian dermoid and other ovarian lesions, may also cause this syndrome, as may other causes of insulin resistance, such

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as lipoatrophic diabetes and pineal lesions. Drugs such as estrogens, corticosteroids, nicotinic acid, and recently somatotropin have been documented as causes of AN.

Biopsy of AN shows hyperkeratosis, acanthosis, and papillomatosis with increased pigments in the basal layer - purely non-specific.

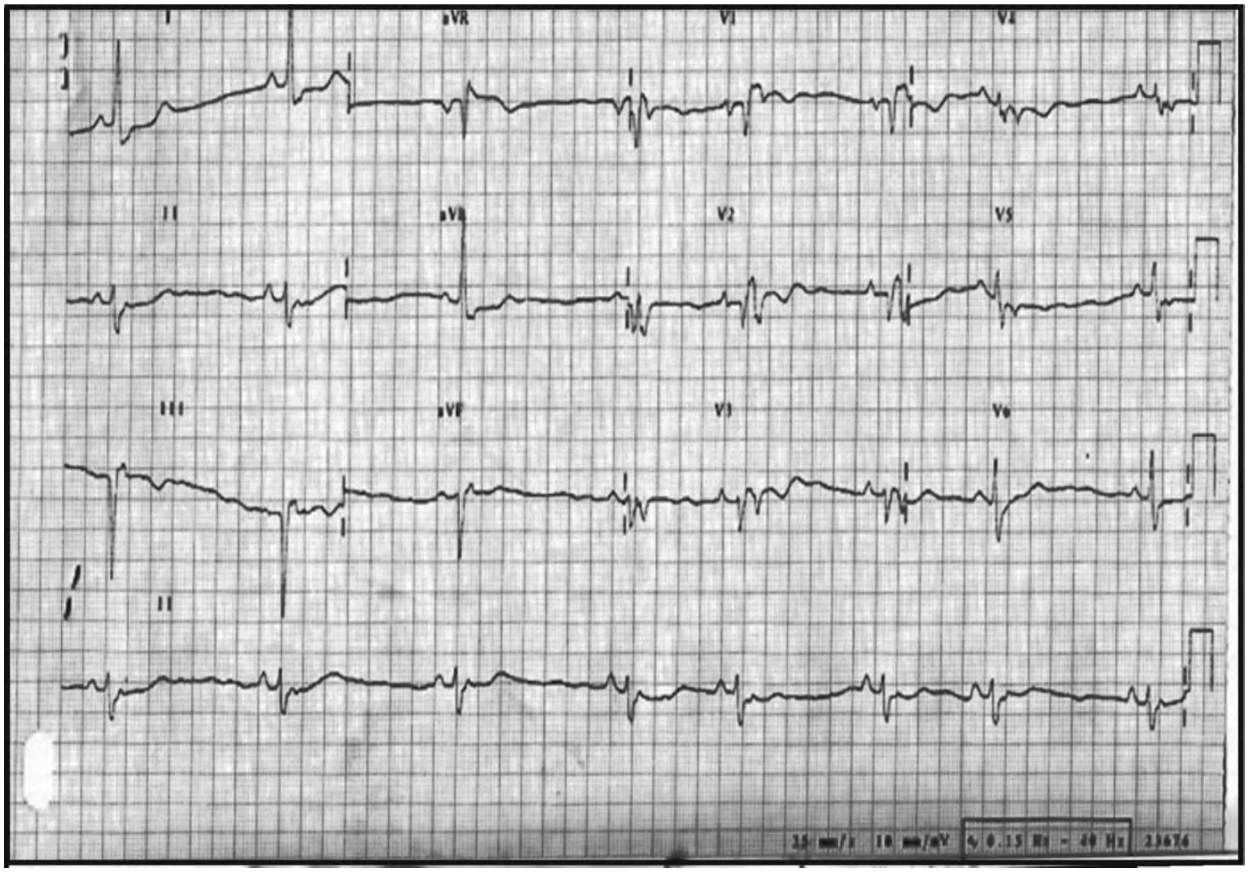
Treatment

Treatment is that of the underlying disorder where possible, weight loss, and topical agents such as emollients or keratolytics. Metformin may help to normalize the background endocrine abnormalities. Treatment to just improve the appearance includes topical 0.025 to 0.05% tretinoin, 20% urea, alpha hydroxyacids, and lactic or salicylic acid prescriptions.

ECG - Section

Diagnose the ECG

Ulhas M. Pandurangi*



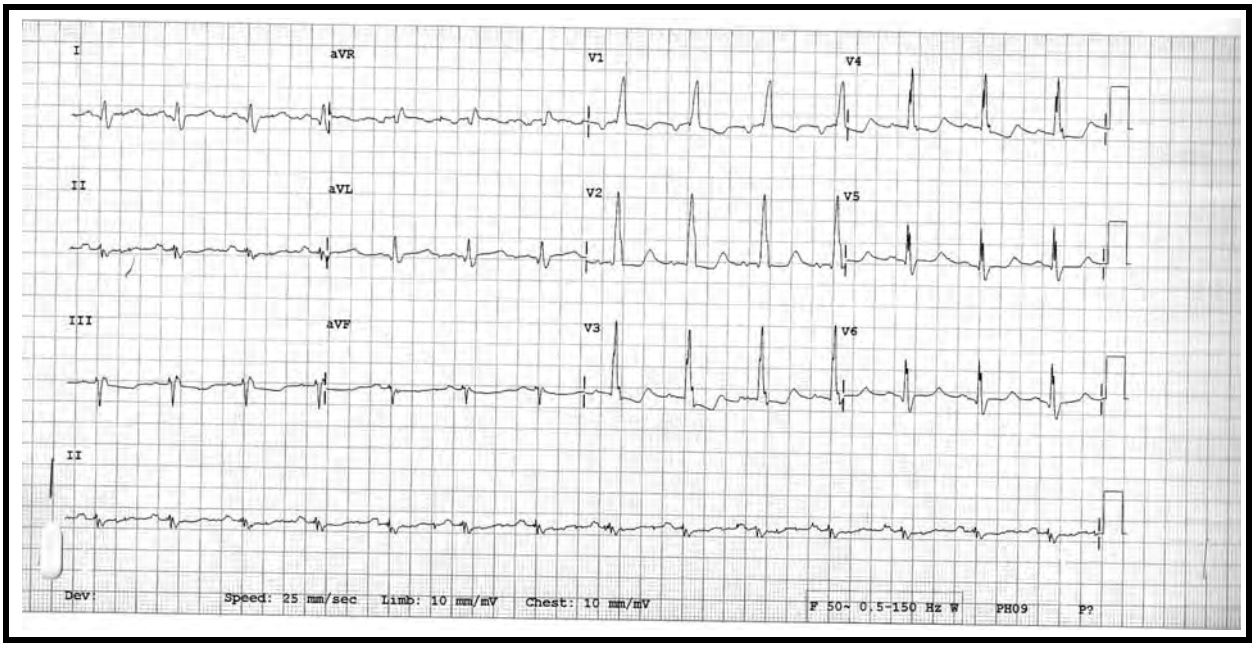
Question: The ECG of A Patient with Recurrent Syncopal Episodes is shown above. What is the Diagnosis?

Answer for the previous issue:
The first half of the Trace - WPW syndrome.
Next half of the ECG Trace - Disappearance of Pre-Excitation with T-wave memory sign.
This ECG is a good demonstration of secondary ST-T changes occurring during
Pre-Excitation and soon after disappearance of Pre-Excitation.

*Senior Consultant Cardiologist & Electrophysiologist and Interventional Cardiologist, Madras Medical Mission, Chennai, Tamilnadu

QUIZ

QUIZ: E.C.G.



Questions

(a) What are the striking features in this ECG?

(b) What is the inference from these findings?

(c) What is the commonest condition that can produce these findings?

Answers for the previous issue

(a) Analysis of this monophasic R wave gives us the clue that :

- ❖ An initial slur known as Delta wave is evident
- ❖ PR interval is shortened & widening of QRS is evident
- ❖ As a definite rule PJ interval remains constant while PR interval shortens as much as QRS interval widens
- ❖ Secondary ST segment & T wave changes are strikingly seen
- ❖ These changes are reflected in all the precordial leads ---Hence it is WPW syndrome

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(b) Detection of Right ventricular hypertrophy is difficult but not impossible

- ❖ (applying the same rule)
- ❖ (1) Tall R waves ; R waves greater than 1.0 or 1.5mv
- ❖ (2) Right axis deviation in both Tri axial reference system and right ward axis in hexaxial reference system are pointers for RVH .

(c) As the changes are seen in all the precordial leads and other evidences are lacking to say it is RBBB

(d) Left atrial enlargement is also evident .

(e) The different QRS pattern may provide a clue to the degree of elevation in right ventricular pressure, in general qR or rSR' pattern Incomplete RBBB tells us that Right ventricular pressure exceeds (qR) is equal to (R or rR) or it is lower than (rsR') the left ventricular pressure respectively, eg severe pulmonary stenosis or pulmonary hypertension (qR), Tetrology of Fallot, Eisenmenger's complex (R or rR), and atrial septal defect (rsR') respectively.

NEWS FROM API CITY CHAPTERS IN TAMIL NADU

The Association of Physicians of India, Tirunelveli Chapter in association with Department of Medicine, Tirunelveli Medical College, had organized a CME programme ' MEDICINE UPDATE 2010' on 19th September 2010 at the Medical college premises.

NEWLY FORMED BRANCH AT THOOTHUKUDI

3rd From Left (Dr.K.Vijayakumar, Executive Committee Member, API TN Chapter, Dr.S.S.Annamalaisamy, Ex-officio Member, API TN Chapter, Dr.S.Arulrhaj, Member, Governing Council, Central API, Dr.Vijay Viswanathan, Chairman, API Tamilnadu Chapter, Dr.D.Selvaraj, Chairman, API Thoothukudi chapter, Dr.S.Rajan, Hon.Secretary, API Thoothukudi chapter)

Announcement

TAPICON 2011

7TH STATE ANNUAL CONFERENCE OF THE ASSOCIATION OF PHYSICIANS OF INDIA TAMILNADU STATE CHATER

Hosted by : API DINDIGUL CHAPTER
Date : MARCH 25 – 27, 2011
Venue : KODAI INTERNATIONAL, KODAIKANAL

Special Features:

- ✓ Practical aspect topics
- ✓ MEDICINE UPDATE book release – First time
- ✓ Text book of emergency medicine two volumes by Dr. Suresh David CMC, Vellore – Book Release
- ✓ 3 days conference
- ✓ Breaks fast with Experts on Sunday
- ✓ 4 WORKSHOPS by various field experts on 1st day
- ✓ Free paper presentation on 2nd day
- ✓ Quiz programme on 3rd day
- ✓ Dr. M.G.R. Medical university has approved 20 credit points for the PG students for attending the conference

FOR PG., Students:

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CRITERIA

- ✓ Age < 45 yrs
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- ✓ Should not be published in any journals

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Peer review

Manuscripts should be prepared in accordance with "Uniform Requirements for Manuscripts submitted to Biomedical Journal" (N Engl J Med 1991; 324: 424-28 or Br Med J. 1991; 302: 338-41) developed by International Committee of Medical Journal Editors.

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Articles from a Book: Yokoyana K, Suyama T, Naito R Development of Fluosol D. A., And its perspective as a blood substitute. In: Oxygen and life, proceeding of the second Pristley conference. Royal Society of Chemistry, London, 1908; 142-52. (Note punctuations)

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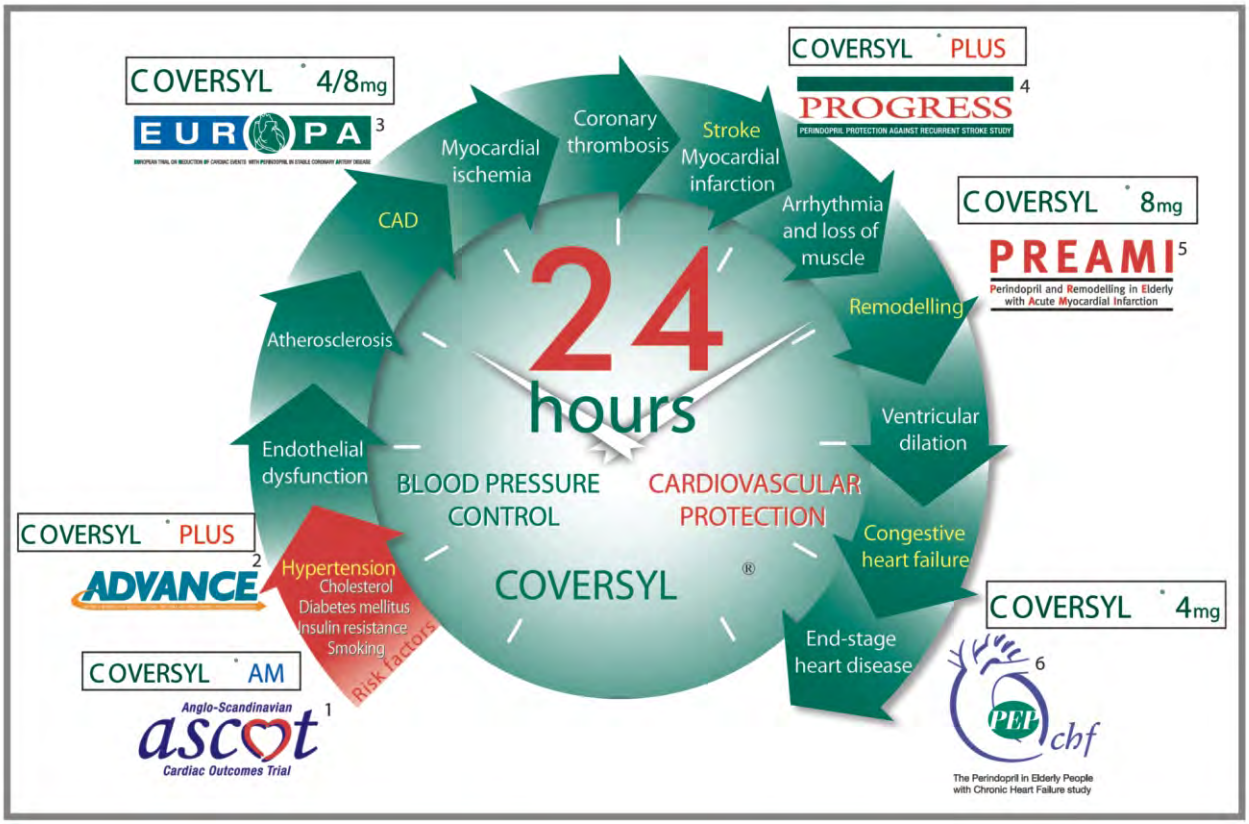

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1. Dahlof B, Sever PS, Poulter NR, et al. Lancet.2005;366:895-906. 2. ADVANCE Collaborative Group. Lancet; Sept 2, 2007 (DOI:10.1016/S0140-6736(07)61303-8). 3. EURO PA investigators. Lancet.2003;362:782-788.
4. PROGRESS Collaborative Group. Lancet.2001;358:1033-1041. 5. Ferrari R. Arch Intern Med.2006;166:659-66. 6. PEP-CHF investigators. Eur Heart J.2006;27:2338-2345.