Clinical Analysis of Carcot Marie Toth Disease (CMTD) Cases

Zaki Noh* FICMS

Ali Ismail** FICMS

Abstract :

Objective: to evaluate Charcot Marie Tooth Disease CMTD cases attending Al-Kindi and Al-Yarmouk teaching hospital clinically and neurophysiologically and drew the family pedigree for each patient.

Methods: sixty eight patients with CMTD ,belonging to 17 families were included in this study . Neurophysiological study were done for each patient according to which a demyelinating or an axonal type was said to be present and the seventeen families were plotted in pedigree and probable mode of inheritance was suggested for each family .

Results: forty patients belonging to 10 families have a demyelinating type with an autosomal dominant mode of inheritance in 6 families and autosomal recessive mode in the rest 4 families. Twenty eight patients belong to 7 families have axonal polyneuropathy with autosomal dominant in 2 families and autosomal recessive in the rest 5 families .

Conclusion: genetic counseling and family planning are needed in our community to offer a better understanding and prevent the growing of the problem .

Key word : hereditary neuropathy ,genetics

Introduction :

Charcot Marie Tooth Disease identifies the most common inherited type of the polyneuropathies[12] the prevalence rate is 1/3000-6000 of the general population.[1,2] CMTD comprises a range of ademylinating group classified as CMT/1 and axonal group CMT/l 1, with various types of inheritance.[1.2.3].

The patients generally present in childhood or adolescence, yet elderly patients may be identified , usually the patients have distal muscle weakness ,skeletal deficit (pes cavus, hammer toe, and scoliosis) and absent distal tendon reflexes .[1.2.3].

The aim of this study is to analyze the CMTD cases attending Al-kindi and Al-Yarmouk teaching hospitals clinically and neurophysiologically and draw the family pedigree for each patient.

Patients & Methods:

sixty eight patients, with age ranged from 3-41 years, belong to 17 families were included in our study which was carried out for the period between 1998 and 2001 in Al-kindi and Al- Yarmouk teaching hospitals. The patient is considered with in CMTD group when meeting the following criteria (3.4.)

1-the patient must have clinical manifestations of mixed sensory-motor polyneuropathy .

2-other members of the family have the same type of polyneuropathy clinically and electro physiologically.

3-The patient should have one or more of the following skeletal deficits (pes cavus , pes planus , hammer toes , scoliosis).

4-Other acquired causes of polyneuropathy were excluded .

The patient was asked about weakness, wasting, muscle cramps, altered sensations, postural dizziness, sphincters dysfunction Visual deterioration, tremor and imbalance.

Medical examination was done for all patients looking for any cardiac and /or locomotor abnormalities. Full neurologic examination was done for all the patients.

All the patients had full blood count, blood film, heavy metal (lead, arsenic, and mercury) screen, chest Xray, and abdominal ultrasound searching for hidden neoplastic disease. TB. Brucliosis, Syphilis were excluded by AFB testing in the sputum, brucella IFAT, TPHA respectively. Thyroid function test was done for all the patients. CSF examination was done for 15 patients only ; and others refused the test.

Electromyography and nerve conduction studies were already done to differentiate between the demyelinating and axonal types. The 17 families scoring the above criteria were plotted in pedigrees and probable mode of inheritance was suggested for each family.

Results

sixty eight patients had clinical features of CMTD were included in this study. forty patients out of 68 (59%), belonging to 10 families, have a demyelinating type of polyneuropathy. While 28 patients belonging to 7 families (41 %) have axonal polyneuropathy. Family pedigree suggestive of autosomal dominant probable mode of inheritance was found in 6 (60%) families of a demyelinating type of CMTD which is called CMT1; the rest 4 families (40%)have an autosomal recessive mode of inheritance. Table (1).

Autosomal dominant mode of inheritance was suggested in 2 out of 7 families(28%) with axonal polyneuropathies (CMT11). The other 5 families who have axonal polyneuropathies (72%) were found to have autosomal recessive mode of inheritance.

Female /male ratio in CMT1 was 12/28 (1\2.3);

while in CMT II the female\male ratio was 21\7 (3\1). Table (1).

Eighteen CMT1 cases were presented between 1-10 years, 20 CMT I cases between 11-20,1 CMT1 patient at age of 35 and 1 patient at age of 42.
sixteen CMT11 patient were presented between 1-10 years; 10 CMT11 patients between 11 -20years and 2patients between thirty and forty years Table (2).

Distal weakness of grade 4-5 was present in 30\40 of CMT1 and grade 1-3 in 10\40. In CMT11 cases, 18 patients out of 28; have grade 4-5 distal weakness and 10 patients have grade 1-3 distal weakness. Table (3).

Table (1) families with CMTD classified according to pathology and probable mode of inheritance

	Demyelinating CMTD	**Axonal CMTD**	**Total**
Dominant probable inheritance	6	2	8
Recessive probable inheritance	4	5	9
Total	10	7	17

Table (2) age onset of CMTD.

Age	**1-10 years**	**11-20 years**	**> 20 years**	**Total**
CMT 1	8	30	2	40
CMT 11	7	19	2	28
Total	15	49	4	68

Table 3 The grade of muscle weakness in cases of CMTD.

Distal weakness	**Grade 4-5 weakness**	**Grade 1-3 weakness**	**Total**
CMT 1	30	10	40
CMT 11	18	10	28
Total	48	20	68

Foot drop was present in 28 of CMT1 patients (70%); while it presents in 23(82%) patients with CMT11. Table (4) .

Pes cavus was present in all CMTl patients and in 27\28 CMT11 patients. Pes planus was present in one patient with CMT11. Scoliosis is present In 50% of both groups of CMTD. Inverted Champaign bottle appearance was seen in all our patients. Table (5).

Gloves and stocks sensory impairment is present in 38\40 of CMT1 patients and in 28\28 of CMT11. Table (6).

Cranial nerve involvement's was present as an optic atrophy in 5 patients of CMT1, and 1 patient with CMT11. Table (7)

Autonomic nervous involvement's (postural hypotension only) was presents in 7patients of CMT1, and 5 patients with CMT11. Table (8).

Table 4 Foot drop in patients with CMTD

Foot drop	Present	Not present	Total
CMT 1	40	0	40
CMT 11	27	1	28
Total	67	1	68

Table 5 presence of pes cavus in CMTD cases .

Pes cavus	Present	Not present	Total
CMT 1	40	0	40
CMT 11	27	1	28
Total	67	1	68

Table 6 glove and stoking sensory loss in cases with CMTD.

Glove & stoking	Present	Not present	Total
CMT 1	38	2	40
CMT 11	28	0	28
Total	66	2	68

Table 7 cranial nerve involvement in CMTD.

Cranials	Present	Not present	Total
CMT 1	5	35	40
CMT 11	1	27	28
Total	6	62	68

Table 8 autonomic neuropathy patients with CMTD.

Autonomic involvement	Present	Not present	Total
CMT 1	7	33	40
CMT 11	5	23	28
Total	12	56	68

Discussion

CMTD forms 17% of polyneuropathies in our study , this is considered very low in comparison to 3 0-40% in P.K DYCK 5study and same percent of Harding —Thomas study [6]. CMT 1 percentage is low in Al-tahan study 7, and Buchthal &Behse [8] study; which agree with our study. This low percentage of CMTD as a whole and CMT1 in these studies; is explained by strict selection criteria, poor awareness of of the general population about the condition, reduced penetrance, and poor information about genetics among medical staff . In the present study, there was higher percent of CMT1 (59%) than CMTll (4 1%) and this is in agreement with other studies [4.5, 6.7]. We found in the present study, that the autosornal recessive probable mode of inheritance was 40% and 72% of CMT1 and CMT11 respectively; this figure is higher than in Buchthal and Behse 8, but in agreement with Dyck-Lambert [5] study and Altahan study ‘: this high percent in AL-Tahan study and in the present study is related to high consanquity marriage in our communities and to more sever clinical features of autosomal recessive diseases. The present study showed more female affection in-patients with CMT11; this result is contrasting Harding —Thomas studies [6] The present study showed more sever clinical features like weakness, feet drop in autosomal recessive cases compared to autosomal dominant cases; this is explained on the bases of mendelian laws of inheritance; as autosomal recessive cases needs tow diseased genes for occurrence.

CMT1I patients were presented earlier than patients with CMT 1. The youngest patient in the present study was a child aged three years and belongs to a family with CMT11.

Conclusion

1-This study showed high percent of CMTD despite failure to seek medical consultations.

2- Consultants in genetics and family planning are needed in our community for counseling to prevent the growing of the problem.

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*from med.dept. Al kindi college of medicine .

** from med.dept. Al mustansiryah college of medicine