Nerve biopsy studies in Chronic Idiopathic Axonal Polyneuropathy (CIAP): report of 8 cases

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Background

Acquired chronic prevalently-sensory axonal polyneuropathy is a common disorder typical of a middle and late adulthood. To date it has been associated with many putative causes. A group of cases is due to well identifiable etiological factors such as metabolic, toxic, infectious, systemic or hereditary disorder. In another group are included anecdotal reports or, however, situations in which the association with the hypothetical cause and the related pathogenesis remains unclear. During the years, these patients underwent expensive and repeated laboratory investigations to search of improbable causative factors. In a third group, extensive laboratory investigations failed to find any known cause. So, the term chronic idiopathic axonal polyneuropathy (CIAP) was coined. It seems that the percentage of polyneuropathies falling in this category varies from 20 to 70%, according with various statistical reports.

Materials and Methods

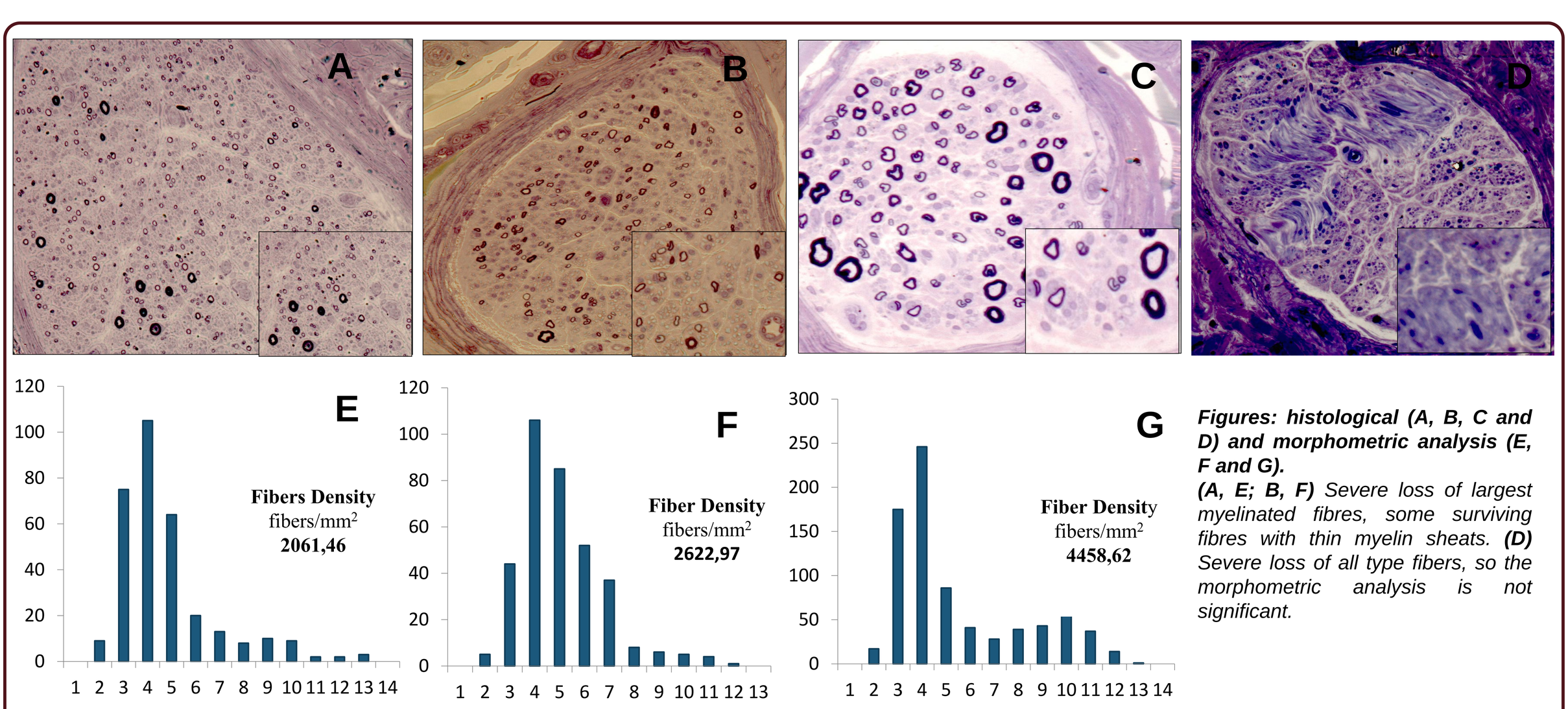
We analyzed a group of 8 patients fulfilling clinical and laboratory criteria for idiopathic axonal polyneuropathy, in which a peripheral nerve biopsy was performed. Nerve specimens were processed for optic and electron microscopy. A morphometric study was also performed. The aim of the study was to evaluate the importance of peripheral nerve biopsy in the diagnostic approach to cryptogenic axonal polyneuropathy.

Results

All biopsies showed, to a different extent, findings compatible with axonal neuropathy: loss of myelinated fibers (9/8), rare clusters of regeneration (4/8), small surviving thinly myelinated fibers (7/8). In neither of them are present myelinophagic cells or active degeneration signs.

Age/Sex	Muscle weakness	Sensory symptoms	Nerve conduction studies (NCS)
67/F	Distal arms and legs	Pain and paresthesias in distal arms and than in distal legs	***right profundus peroneus nerve*:** MCV 24.2 m/s (n.v >39.08) CMAP 0.60 mV (n.v >0.74) ***right tibial nerve:*** MCV 36.3 m/s (n.v >39.2) DLM 7.69 ms (n.v < 7.35) CMAP 0,49 mV ***right sural nerve:*** SCV 36.6 m/s (n.v >40.8) SAP 4.5 µV (n.v >10)
50/F	Proximal and distal arms and legs	Pain in distal legs	***right superficiale peroneus nerve:*** SAP 2.8 µV ***left superficial peroneal nerve:*** response absent ***right sural nerve:*** SAP 3.2 µV ***left sural nerve:*** SAP 3.6 µV
36/M	None	Paresthesias in face, arms and legs	***left superficial peroneal nerve:*** SAP 1.7 µV ***right sural nerve:*** SAP 5.5 µV ***left sural nerve:*** SAP 4.8 µV
50/F	Distal legs	None	***right profundus peroneus nerve:*** MCV 23 m/s CMAP 0.21 mV DML 8.62 ms ***right tibial nerve:*** MCV 32 m/s CMAP 0.684 mV DML 8.24 ms "F" response: absent ***left sural nerve:*** response absent ***right sural nerve****:* SAP 4.4 µV
47/M	Distal legs	Pain in distal legs	***right superficial peroneal nerve:*** response absent ***right and left sural nerves:*** response absent
50/M	Distal arms and legs	Pain and parestesias in distal legs	***left superficial peroneal nerve:*** SCV 36.3 m/s SAP 1.4 µV ***left tibial nerve:*** MCV 38.6 m/s ***right sural nerve:*** SAP 3.1 µV
45/M	Distal arms and legs	Pain and parestesias in distal legs	***right and left median nerves:*** response absent ***right and left peroneus profundus nerves:*** response absent ***right and left tibial nerves:*** response absent ***right and left sural nerves:*** response absent
50/F	Distal legs	Pain and paresthesias in distal legs	***right peroneus profundus nerve:*** CMAP 1,7 mV DML 6.29 ms ***right and left tibial nerves:*** response absent ***left sural nerve:*** SAP 5.2 µV ***right sural nerve:*** SAP 8.1 µV

Table: clinical and electrophysiological features
CMAP= compound muscle action potential; SAP= sensory action potential; DML= distal motor latency



Figures: histological (A, B, C and D) and morphometric analysis (E, F and G).
(A, E; B, F) *Severe loss of largest myelinated fibres, some surviving fibres with thin myelin sheats.* ***(D)*** *Severe loss of all type fibers, so the morphometric analysis is not significant.*

Discussion

In the present series, clinical symptoms and electrophysiological study are compatible with CIAP; the extensive laboratory investigation failed to found common causes of neuropathy. At the nerve biopsy, the constant finding is the loss, to a different extent, of myelinated fibers that mostly involving those of large diameter; the simultaneous absence of myelinophagic cells and the paucity of active axonal degeneration indicate a very slow pathological process, like "dying back" type degeneration. Some authors proposed CIAP as an autonome distinct entity in which the pathogenesis remains still oscure. It is possible that this disorder has a multifactorial pathogenesis. To date, no abundant pathological studies on peripheral nerve of CIAP patients have been performed. It know that peripheral nerve biopsy, does not provide valid diagnostic help, except rare conditions such as amyloidosis, inflammation, some HSMN. However, it may provide important information concerning the pathological process.

References:

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