Pathology – Research and Practice 207 (2011) 256–261

Contents lists available at ScienceDirect

Pathology – Research and Practice

journal homepage: www.elsevier.de/prp

Teaching cases

# Glycogen-rich pleomorphic xanthoastrocytoma with clear-cell features: Confirmatory report of a rare variant with implications for differential diagnosis

Istvan Vajtai[a,c,*], Alexander Stibal[b], Michael von Gunten[c], Andreas Kappeler[d], Erik Vassella[e], Stephan Frank[f]

[a] Neuropathology Service, Institute of Pathology, University of Bern, Switzerland
[b] Department of Neurosurgery, University Hospital "Inselspital", Bern, Switzerland
[c] Department of Clinical Histopathology, Institute of Pathology, University of Bern, Switzerland
[d] Laboratory of Diagnostic Immunohistochemistry, Institute of Pathology, University of Bern, Switzerland
[e] Laboratory of Molecular Pathology, Institute of Pathology, University of Bern, Switzerland
[f] Department of Neuropathology, Institute of Pathology, University Hospital Basel, Switzerland

ARTICLE INFO

*Article history:*
Received 10 August 2010
Accepted 20 December 2010

*Keywords:*
Pleomorphic xanthoastrocytoma
Clear-cell neoplasm
Clear-cell ependymoma
Oligodendroglioma
Differential diagnosis

ABSTRACT

Central nervous system space-occupying lesions with clear-cell features encompass a nosologically heterogeneous array, ranging from reactive histiocytic proliferations to neuroepithelial or meningothelial neoplasms of various grades and to metastases. In the face of such differential diagnostic breadth, recognizing cytoplasmic lucency as part of the morphological spectrum of some low grade gliomas will directly have an impact on patient care. We describe a prevailing clear-cell change in an epileptogenic left temporal pleomorphic xanthoastrocytoma surgically resected from a 36-year-old man. Mostly subarachnoid and focally calcified, the tumor was composed of fascicles of moderately atypical spindle cells with optically lucent cytoplasm that tended to intermingle with a desmoplastic mesh of reticulin fibers. Immunohistochemically, coexpression of S100 protein, vimentin, GFAP, and CD34 was noted. Conversely, neither punctate staining for EMA nor positivity for CD68 was seen. Mitotic activity was absent, and the MIB1 labeling index was 2–3% on average. Diastase-sensitive PAS-positive granula indicated clear-cell change to proceed from glycogen storage. Electron microscopy showed tumor cell cytoplasm to be largely obliterated by non-lysosomal-bound pools of glycogen, while hardly any fat vacuole was encountered. Neither ependymal-derived organelles nor annular lamellae suggesting oligodendroglial differentiation were detected. The latter differential diagnosis was further invalidated by lack of codeletion of chromosomal regions 1p36 and 19q13 on molecular genetic testing. By significantly interfering with pattern recognition as an implicit approach in histopathology, clear-cell change in pleomorphic xanthoastrocytoma is likely to suspend its status as a "classic", and to prompt more deductive differential diagnostic strategies to exclude look-alikes, especially clear-cell ependymoma and oligodendroglioma.
© 2011 Elsevier GmbH. All rights reserved.

## Introduction

Pleomorphic xanthoastrocytoma (PXA) is a primary neuroepithelial neoplasm of the central nervous system (CNS), whose topographic incidence and histological composition have traditionally been regarded as suggestive of an origin from subpial astrocytes – possibly compounded by a dysontogenic moment. Salient features of PXA include superficial hemispheric location in young patients and prominent lipid storage by tumor cells that, in turn, tend to be ensheathed by basal lamina – coupled with misleading cytological atypia [3,8,13].

Since its introduction as an entity by Kepes et al. [13], several reports on unusual variants have come to semantically enrich the original meaning of "pleomorphic" to imply considerable clinicopathological heterogeneity of PXA as well. Most notable departures from the classical, ontogenetically consistent, pattern include deep-seated or non-hemispheric lesions [10,18,37], evidence of a neuronal component [20], melanocytic differentiation [33], and exuberant vascularity [34] – to which some unexpected patterns of malignant progression have to be added [5].

Optically lucent cytoplasmic vacuolation due to glycogen storage is apt to make PXA the subject of even broader differential diagnostic considerations in the context of various clear-cell neoplasms and pseudoneoplastic lesions of the CNS [9]. To date, only

* Corresponding author at: Neuropathology Service, Institute of Pathology, University of Bern, Murtenstrasse 31, P.O. Box 62, 3010 Bern, Switzerland.
Tel.: +41 31 632 32 10; fax: +41 31 632 99 38.
*E-mail address:* istvanvajtai@yahoo.com (I. Vajtai).

0344-0338/$ – see front matter © 2011 Elsevier GmbH. All rights reserved.
doi:10.1016/j.prp.2010.12.008

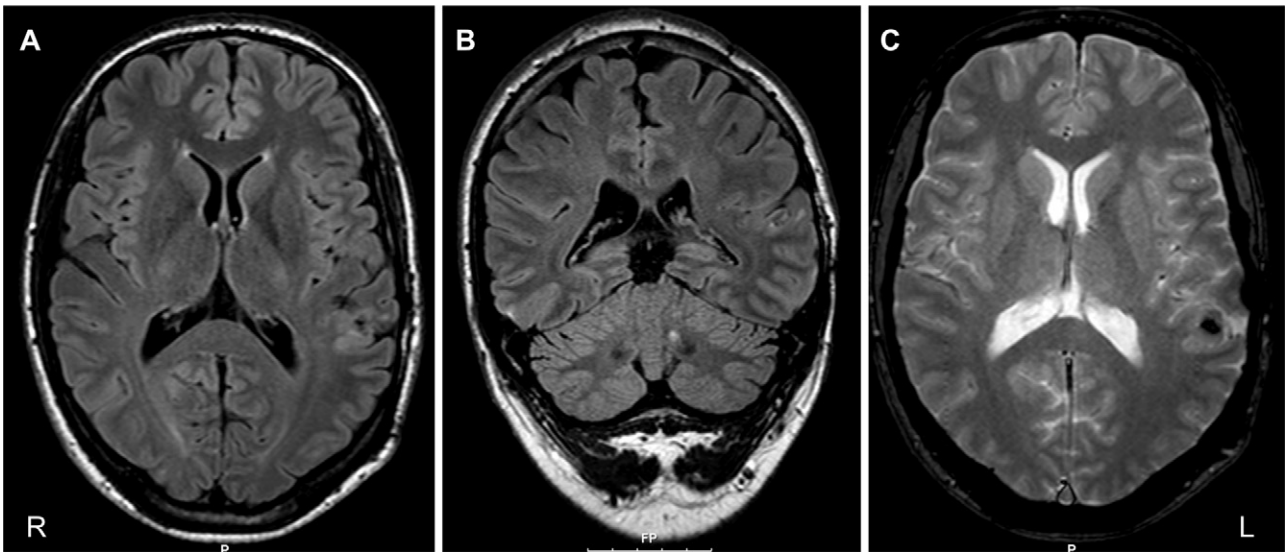


**Fig. 1.** Preoperative $T_1$-weighted axial (A) and frontal (B) MRI scans to indicate small cortico-subcortical defect with reactive gliosis in the posterior part of the left superior temporal lobe corresponding to residuum of the first biopsy procedure nearly twenty years ago. Note lack of evidence of a space-occupying process. (C) $T_2$-weighted sequence corresponding to section plane depicted in (A) shows discreet secondary enlargement of subarachnoid space over the previous biopsy site. No perifocal edema is apparent. L, left; R, right.

two reports of such an occurrence have been published [24,28]. In the following, we document an additional example of glycogen-rich PXA, using immunohistochemistry, electron microscopy, and molecular genetic analysis.

## Case report

### *Clinical history*

The currently 36-year-old left-handed male patient had been suffering from simple and complex partial seizures with secondary generalization since the age of 16 years. One year into clinical history, at an external institution, he had undergone a first surgical resection of the purported epileptogenic lesion, located in the posterior part of the left superior temporal gyrus. On account of a histological diagnosis of pilocytic astrocytoma (WHO grade I), he had been administered conservative antiepileptic pharmacotherapy which, however, failed to bring about relief. Ultimately, he had been experiencing 1–2 ictal episodes of focal type weekly, and up to 2 generalized convulsions per month while under medication with Levetiracetam (Keppra®, 4 g/day) and Oxcarbazepin (Trileptal®, 1200 mg/day).

Twenty years after disease onset, the patient was hospitalized for re-evaluation at the Department of Neurosurgery of University Hospital (Inselspital) of Berne. Magnetic resonance imaging findings in the former resection site were deemed non-specific, and most compatible with residual gliosis (Fig. 1). Electrophysiological mapping by locally implanted grid electrodes, nevertheless, indicated the persistence of an epileptogenic focus corresponding to the residuum of the proximal left superior temporal gyrus and the adjacent portion of the angular gyrus. Subsequently, the critical area (involving approximately 4 $cm^2$ of cortical surface) was resected using a left frontotemporal osteoplastic craniotomy via subpial approach. Postoperative recovery was uneventful, and the patient currently remains seizure-free under antiepileptic medication.

### *Materials and methods*

A review of the histological slides from the first operation revealed a small fragment of subcortical white matter with slight gliosis but no definite hallmarks of a neoplastic process (not shown).

The gross specimen obtained at second surgery consisted of four cortico-subcortical brain fragments totalling approximately 4 cm × 3 cm × 2 cm. Tissue blocks were routinely processed to paraffin, serially sectioned, and 3 μm slides were stained with hematoxylin and eosin (H.E.) and Gomori's silver (Ag) impregnation method for reticulin. Staining with periodic acid–Schiff's reagent (PAS) was done on paired serial sections with and without diastase pretreatment. Immunohistochemistry was performed with the following panel of antibodies: GFAP (clone 6F2; Dako, Glostrup, Denmark), S100 protein (polyclonal; Dako), vimentin (clone Vim 3B4; Dako), EMA (clone E29; Dako), CD34 (clone QBend/10; Dako), CD68 (clone PG-M1; Dako), Ki-67 (clone MIB-1; Dako), P53 (clone DO-7; Dako), synaptophysin (clone Snp88; BioGenex), and neurofilament protein (clone 2F11; Dako), according to established protocols in our laboratory, the details of which have been documented previously [36]. Slides were developed with polymer-bound horseradish peroxidase (Envision+; Dako) and 3,3′-diaminobenzidine as chromogen.

For ultrastructural study, representative tissue fragments were retrieved from one of the paraffin blocks, postfixed in glutaraldehyde and transferred to Spurr's Resin (SERVA – Heidelberg, Germany) for ultrathin sectioning. Grids were contrasted with uranyl acetate and lead citrate, and viewed in a Zeiss E10 transmission electron microscope.

Loss of heterozygosity (LOH) analysis for microsatellite markers on chromosomal regions 1p36 (D1S468, D1S1612, D1S228, and D1S214) and 19q13 (D19S219, D19412 and D19-HRC) was performed according to a protocol described by Mariani et al. [16]. Analysis of PCR products was done by capillary electrophoresis using a genetic analyzer (ABI Prism 3100 Avant, Applied Biosystems, Rotkreuz, Switzerland).

### *Pathological findings*

Light microscopy showed a moderately cellular glial neoplasm extending cast-like in the subarachnoid space with fairly limited infiltration of the subjacent brain parenchyma, and no significant mass effect (Fig. 2A). Enmeshed in a tight scaffold of reticulin fibers,

Download English Version:

https://daneshyari.com/en/article/2155903

Download Persian Version:

https://daneshyari.com/article/2155903

Daneshyari.com