

## CASE REPORTS

# An unusual cause of haemorrhage in the subthalamic nucleus of luys: A post-mortem study with 7.0 tesla magnetic resonance imaging correlates

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## ABSTRACT

The present case report is the first one of an isolated haemorrhage in the subthalamic nucleus of a patient with an isolated central nervous system relapse of systemic non-Hodgkin lymphoma. The neuropathological findings and 7.0-tesla magnetic resonance imaging correlates are presented.

**Key Words:** Haemorrhage of the subthalamic nucleus, Non-Hodgkin lymphoma, Neuropathology, T2\*-weighted 7.0-tesla MRI sequence

## 1. INTRODUCTION

A cerebrovascular accident, especially a haemorrhage is the most common lesion affecting the subthalamic nucleus of Luys. Less usual causes are a metastasis, a demyelinating process, a head injury, a tuberculoma or as a complication of stereotactic interventions.<sup>[1-3]</sup>

We present the case history and the neuropathological findings in a patient with as incidental finding at post-mortem examination a haemorrhage in the right subthalamic nucleus of Luys of unusual origin. Also the post-mortem 7.0-tesla magnetic resonance imaging (MRI) are described.

## 2. CASE HISTORY

A 61-year-old man was admitted in January 2009 for fever of unknown origin. Three hepatic lesions together with abdominal adenopathies were observed on computed tomography. Blood analysis revealed signs of inflammation. The liver tests were normal. No improvement of the fever was obtained with

antibiotics and steroids. Liver biopsies, performed in February 2009, revealed lymphomas possibly of the Hodgkin type. Remission was obtained by chemotherapy in August 2009. In October 2010 the patient developed generalized seizures. The examination did not show focal neurological signs. On MRI of the brain, however, three infiltrating lesions were observed: one in the right cerebellar hemisphere, one in the right parietal subcortical region and one in the upper brain stem. No haemorrhages were detected at that time. Two stereotactic cerebral biopsies were not able to reveal any tumour invasion. The patient deceased five months later.

## 3. MATERIAL AND METHODS

Post-mortem examination was obtained by written informed consent from the nearest family. The brain tissue samples were first used for diagnosis and afterward integrated in the Lille Neuro-Bank, dependant from the Lille University and co-federated by the "Centre des Ressources Biologiques",

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acting as institutional review board.

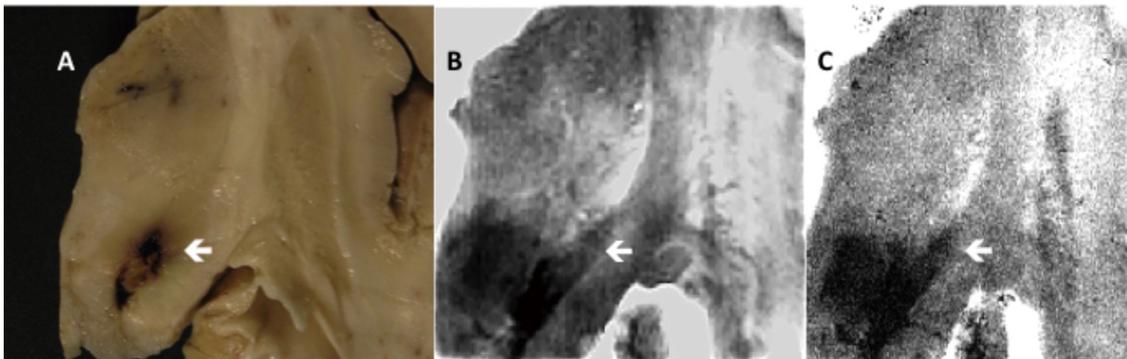
In addition to the gross examination of the brain, samples for microscopically examination were stained with haematoxylin eosin, luxol fast blue and Perls Prussian blue.

Three coronal sections of a cerebral hemisphere were submitted to T2 and T2\* MRI: a frontal one at the level of the head of the caudate nucleus, a central one at the level of the mammillary body and one at the level of the parietal and occipital lobes. In addition one horizontal section of brainstem and cerebellar hemisphere was also examined. A 7.0-tesla MRI Bruker BioSpin SA with an issuer-receiver cylinder coil of 72 mm inner diameter (Ettlingen, Germany) was used,

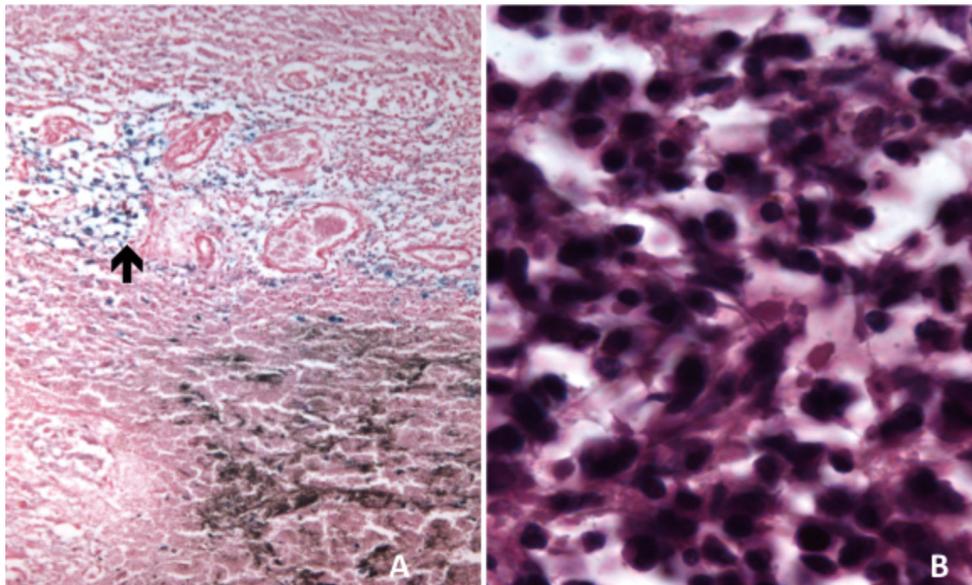
according to a previous described method.<sup>[4]</sup>

#### 4. RESULTS

The general autopsy showed bronchopneumonia and many necrotic and old haemorrhagic lesions in the liver. Not tumour cells were detected Gross examination of the brain showed a haemorrhage restricted to the right subthalamic nucleus of Luys. No other lesions were observed on naked eye examination (see Figure 1A). On T2 and T2\* weighted MRI images a diffuse hypo-intensity of the basal ganglia was observed in addition to the subthalamic bleed (see Figure 1B-1C)).



**Figure 1.** Coronal section of the right cerebral hemisphere. A: the gross examination only shows the haemorrhage in the subthalamic nucleus (arrow); B-C: on the T2 and T2\* MRI sequences not only the haemorrhage is shown (arrows) but also a diffuse hypo-intensity in the basal ganglia



**Figure 2.** Microscopic examination of the lesions. A: haemosiderin deposits are demonstrated in the subthalamic nucleus (arrow) with the Perls Prussian blue stain; B: high-magnification view of the non-Hodgkin lymphoma with the Haematoxylin-Eosin stain

On microscopic examination siderophages and residual haemosiderin deposits were observed in the subthalamic nucleus of Luys (see Figure 2A). Polymorphic infiltrates of large lymphoid cells with many mitoses were observed in the right basal ganglia and subcortical structures, also invading the upper brainstem. There was also tumoural infiltration of the blood vessel walls. Although some large cells resembled to Sternberg cells the tumour was considered as a non-Hodgkin lymphoma (see Figure 2B).

## 5. DISCUSSION

The overall incidence of intracranial haemorrhage among adult patients with haematological malignancy is 2.8%. It is

more common among patients with central nervous system involvement by a lymphoma with a cortical predilection site of 83%.<sup>[5]</sup> However, isolated central nervous relapse involving the brain parenchyma is a rare complication of systemic non-Hodgkin lymphoma.<sup>[6]</sup>

The present case report is the first one of a unique haemorrhage in the subthalamic nucleus related to isolated central nervous system relapse of systemic non-Hodgkin lymphoma.

## CONFLICTS OF INTEREST DISCLOSURE

The authors have declared no conflicts of interest.

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