Small Intracranial Lipomas May Be a Frequent Finding on Computed Tomography of the Brain

A Case Series

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SUMMARY – *Intracranial lipomas are described as a rare finding. In this small retrospective analysis of 50 cases undergoing brain CT for various reasons small intracranial lipomas were found in nine patients. In contrast to previous reports lipomas may be a frequent finding on CT imaging of the brain. In particular, these small lipomas seem to be incidental findings lacking clinical relevance. Radiologists should be aware of intracranial lipomas to establish proper differential diagnosis.*

Introduction

Intracranial lipomas are a well-known entity and are described as a rare finding with an incidence between 0.08 and 0.46% in autopsy series¹. A review of 3000 brain computed tomography (CT) scans of head trauma patients reported only three lipomas, i.e. in 0.1% of the scans². In contrast to this reported low incidence, in our department we seem to observe small intracranial lipomas quite regularly. To highlight and discuss this finding a small sample of 50 brain CT scans was reviewed for small intracranial lipomas.

Material and Methods

A retrospective analysis of 50 consecutive brain CT scans was performed in August and September 2012 at our department. Brain CT scans with marked pathology and therefore disturbed anatomy (haemorrhage, tumour, infarction) were not considered for inclusion. The sample consisted of 23 male and 27 female patients with a mean age of 71.5 years (range 19-91 years). All patients were scanned on a 16-slice CT scanner (Activion®, Toshiba

Medical Systems, Tokyo, Japan) with identical parameters and a slice thickness of 1 mm. Data sets were post-processed on a standard medical workstation (Vitrea® 2, Vital Images, Minnetonka, MN, USA). The primary axial 1 mm slices were reviewed using a standard window setting for brain imaging (window width 80 HU / window level 40 HU) followed by analysis with a dedicated window setting for optimal recognition of small lipomas (window width 130 HU / window level -10 HU). Only clearly visible and measurable lipomas (negative HU) were recorded. Measurement in questionable small lipomas was sometimes not possible because a region of interest could not be adequately positioned and only point-like measurements would have been possible. Therefore questionable lipomas measuring less than 3 mm were not recorded. The maximal length was noted.

Results

In this sample clearly visible small lipomas were found in nine patients with a prevalence in this study of 18% (9/50). Most of these small lipomas were located interhemispherically

Figure 1 Axial CT scan of the brain in an 88-year-old patient undergoing diagnostic work-up for suspected brain ischemia. Several small intracranial lipomas in the midline adjacent to the falx cerebri can be seen (on the left). Density measurement confirms the fatty nature of these lesions (on the right).

adjacent to the falx cerebri (Figure 1). Two patients showed lipomas adjacent to the brain stem. Five patients showed multiple small lipomas. Most lipomas were ovoid in shape. These lipomas were incidental findings unrelated to clinical symptoms. No patient showed signs of brain malformation. Details of indication for brain imaging and a description of the imaging findings can be found in Table 1.

Discussion

In this retrospective series small intracranial lipomas were found in 18% of patients undergoing brain CT. Despite the obvious limitations of a relatively small retrospectively selected patient sample, it seems that the prevalence of intracranial lipomas is more frequent than previously reported. Reported incidences in autopsy series range between 0.08 and 0.46% and a review of 3000 brain CT scans of head trauma patients reported lipomas in only 0.1% of patients^{1,2}. This discrepancy needs to be explained and seems to be related primarily to the small size of the lipomas found in our series. On gross pathologic examination these

small lesions were very hard to recognize. The CT technique is also important. In most departments incremental CT scans with a slice thickness of 4 to 8 mm are used, so small lipomas may be easily missed due to volume averaging artefacts. In contrast, in our department all brain CT scans are performed as a spiral CT with a slice thickness of 1 mm with improved spatial resolution. Without the use of a dedicated window setting small lipomas may be difficult to differentiate from the adjacent CSF. Lastly, because of the incidental nature of these small lipomas not showing any disturbance of the gross brain anatomy, they may simply be ignored by reporting physicians.

The formation of intracranial lipomas is explained by persistent foci of the meninx primitiva undergoing fatty transformation, i.e. intracranial lipomas are conceptualized as a congenital malformation³.

Most lipomas are incidental findings lacking clinical relevance⁴. A high percentage of associated brain malformations have been reported, which could not be found in this case series of small intracranial lipomas. This may also be related to the size. In the studies of Truwit et al. and Yildiz et al. most lipomas

Table 1 Details of patients with small intracranial lipomas.

Patient	Sex	Age (years)	Indication for CT imaging	Imaging findings of intracranial lipomas
1	Female	88	Suspected ischaemia	8 small lipomas in the midline measuring up to 6.5 mm
2	Female	72	Head trauma	2 small lipomas in the midline measuring up to 7.5 mm
3	Female	82	Head trauma	2 small lipomas in the midline and 1 lipoma adjacent to the brainstem measuring up to 4.5 mm
4	Male	53	Hypertensive encephalopathy	1 small lipoma in the midline measuring 4 mm
5	Male	47	First epileptic seizure	1 lipoma adjacent to the brainstem measuring 4 mm
6	Male	61	Head trauma	1 small lipoma in the midline measuring 4 mm
7	Female	92	Dementia	1 small lipoma in the midline measuring 4 mm
8	Female	95	Dementia	4 small lipomas in the midline measuring up to 4 mm
9	Female	77	Suspected ischaemia	2 small lipomas in the midline measuring up to 4 mm

were larger than those detected in this case series^{3,5}. One might speculate that there is a continuum of findings with larger lipomas indicating a more disturbed brain formation explaining the high frequency of associated brain malformations. The above-mentioned studies also retrospectively reviewed only patients with previously diagnosed lipomas on imaging making selection bias likely. Symptoms due to lipomas have been reported. In one study Sylvian fissure lipomas were associated with seizures⁵. In a case report Lin et al. discussed the possibility of an intracranial lipoma mistaken for pneumocranium after head trauma⁶. In this scenario density measurements are the clue to diagnosis of intracra-

nial lipoma, as air and fat can be easily distinguished because of their different Hounsfield units.

Conclusion

Small intracranial lipomas may be a frequent finding on CT imaging of the brain. In most cases they are incidental findings. Especially with small lipomas associated brain malformations seem to be uncommon. Radiologists should be aware of this finding to establish proper differential diagnosis. A larger study to determine their exact incidence and the frequency of associated brain malformations is warranted.

References

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