

## Muslinoma as Cause of Vision Loss – A Case Report and Literature Review

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### Abstract

Muslin gauze wrapping is an alternative neurosurgical procedure applied when an intracranial aneurysm is not amenable to direct clipping or its neck cannot be clipped completely. Although rare, it can complicate in a granulomatous inflammation that infiltrates adjacent anatomical structures termed muslinoma.

The authors report the case of a patient who suffered from acute bilateral visual loss, 7 months after neurosurgical wrapping with muslin gauze of a ruptured anterior communicating artery aneurysm and review the previous cases reported in the literature.

A muslin-induced optic neuropathy is an infrequent but serious complication of a chronic inflammatory reaction in response to muslin gauze wrapping. This diagnosis should be suspected in any case of visual loss following cerebrovascular surgery where muslin gauze was used.

**Keywords:** Aneurysm, Neuropathy, Muslin, Visual field loss, Visual loss

### Introduction

As first described by Gillingham in 1958, coating or wrapping with muslin gauze is an alternative neurosurgical technique applied when an intracranial aneurysm is not amenable to direct clipping or its neck cannot be clipped completely [1,2].

Muslin gauze stabilizes the vascular wall and its adhesion to surrounding tissue by inducing the generation of a fibrotic reaction. Although rare, it can complicate in a granulomatous inflammation that infiltrates adjacent anatomical structures termed muslinoma or gauzoma [3,4].

Muslin gauze associated affections of the optic tract or chiasm leading to visual loss of various severity have been described as muslin-induced optic neuropathy or optochiasmal arachnoiditis, in the absence of an identified muslinoma [5,6].

Potential outcome of damage to the visual pathway remains uncertain, as does the optimum management when visual loss occurs.

The authors report the case of a patient who suffered from acute bilateral visual loss 7 months after neurosurgical wrapping with muslin gauze of a ruptured anterior communicating artery aneurysm (ACoA) and review the previous 36 cases reported in the literature.

### Case Report

We report the case of a 51-year-old woman who suffered from a ruptured ACoA. The aneurysm had undergone surgical clipping and wrapping with muslin material. Seven months after surgery, she presented with complaints of acute bilateral painless visual loss.

On examination, visual acuity was counting fingers in the right eye (RE) and 10/10 in the left eye (LE).

Color vision was 1/13 Ishihara color plates (ICP) correct in the RE and 12/13 in the LE.

There was mild RE relative afferent pupillary defect. Extraocular motility was normal, as were corneal and facial sensation. The right optic disc was minimally pale nonetheless the left optic disc appeared normal (Figure 1).

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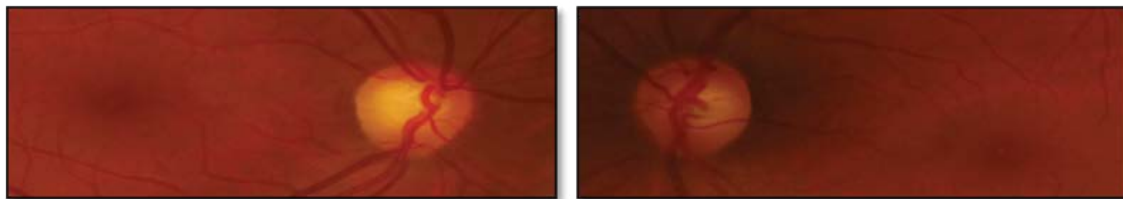


Figure 1: Optic disc appearance. Note right eye discrete temporal rim thinning.

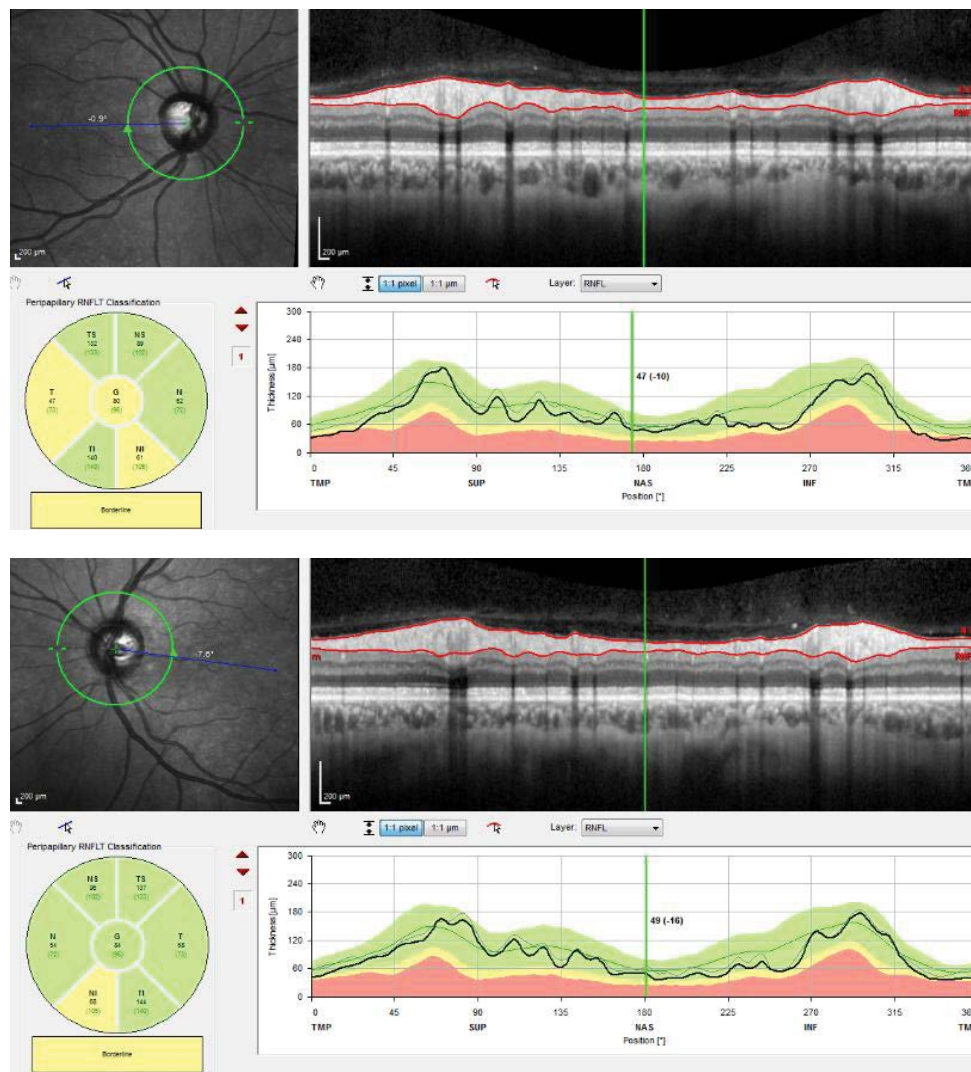


Figure 2: Octopus® 101 static perimetry revealed bitemporal visual field chiasmal pattern defect.

Perimetry showed a bitemporal visual field chiasmal pattern defect (Figure 2).

Spectral Domain Optical Coherence Tomography (SD-OCT) revealed borderline Retinal Nerve Fiber Layer (RNFL) thickness of the right eye's temporal quadrant (T), nasal Inferior (NI) sector and overall global (G) average while the left eye evaluation demonstrated borderline RNFL thickness of the NI sector (Figure 3).

MRI showed a thickened, nodular, gadolinium enhancing area

with involvement of the optic chiasm, but no recurrent aneurysm (Figure 4).

The patient was taken to surgery for exploration and decompression of the optic nerve. A fibrous tumor with adhesive bands was found adjacent to the optic chiasm and excisional biopsy was performed.

Histologic examination revealed a marked inflammatory reaction mixed with strands of birefringent muslin gauze compatible with the diagnosis of muslinoma (Figure 5).

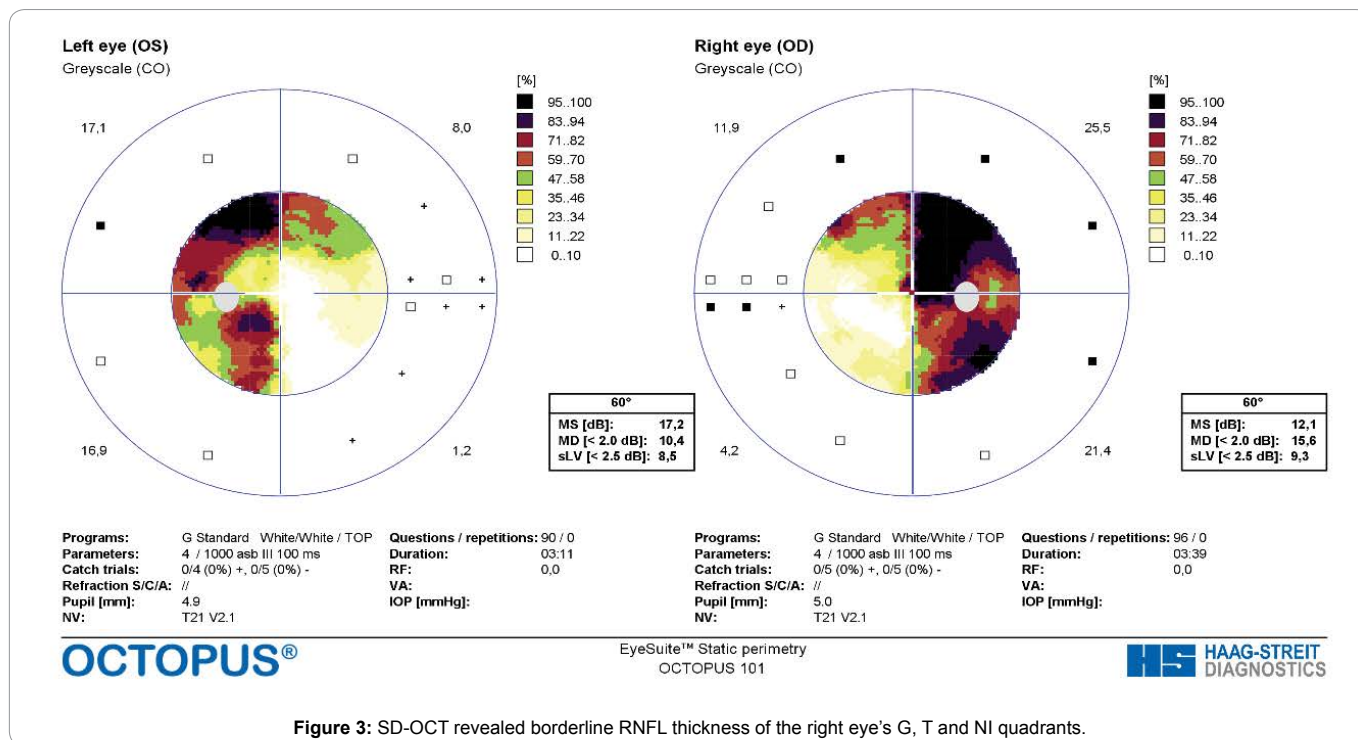


Figure 3: SD-OCT revealed borderline RNFL thickness of the right eye's G, T and NI quadrants.

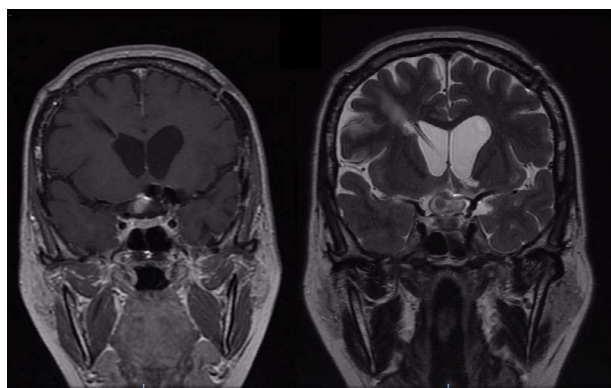


Figure 4: MRI showed a thickened, nodular, gadolinium enhancing area. Note ventricular catheter in place.

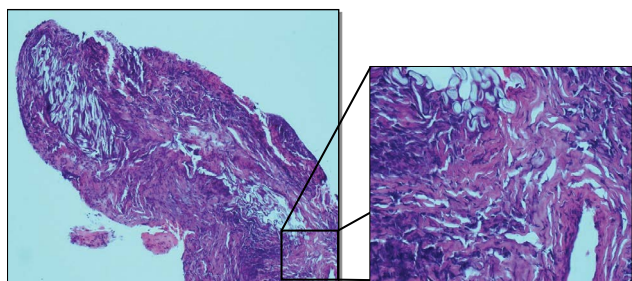


Figure 5: Histopathological examination (haematoxylin and eosin) of excisional biopsied specimen revealed a marked inflammatory reaction mixed with strands of birefringent muslin gauze.

Five days after surgery, there was no significant change in visual function but the patient denoted subjective improvement. At follow-up, 1 month later, the patient's visual acuity had

recovered to 6/10 (11/13 ICP) RE and 10/10 (13/13 ICP) LE with further expansion of the peripheral visual field (Figure 6).

## Discussion

A muslin-induced optic neuropathy (MION) is a rare but serious complication of a chronic inflammatory reaction in response to muslin wrapping.

Including our case, 37 cases of MION have been reported in the literature. Still, over the last 10 years there are only 4 MION reported cases, this fact might be related to the advent of endovascular treatments for cerebral aneurysms [7].

The onset of visual symptoms ranged from 1 to 54 months after primary surgery and most of the patients described were females (30/37).

Although its pathophysiology is not completely understood, proximity of the muslin material to the optic nerves and chiasm appears to be crucial in the development of optic neuropathy.

Other presumed associated symptoms to muslin gauze wrapping included cranial nerve dysfunction, fever, headache, hypothalamic-pituitary-adrenal axis impairment and stroke [8-12].

Treatment approaches have varied from surgical intervention, to steroids, cyclophosphamide and sirolimus [13,14]. Nevertheless, the best treatment option and thus outcome are unknown, as there have been cases of spontaneous improvement, stabilization without any therapy but also worsening despite treatment [15-18].

Table 1 presents clinical features of MION in different studies over the last 11 years.

As most cases of MION present in the first 24 months following

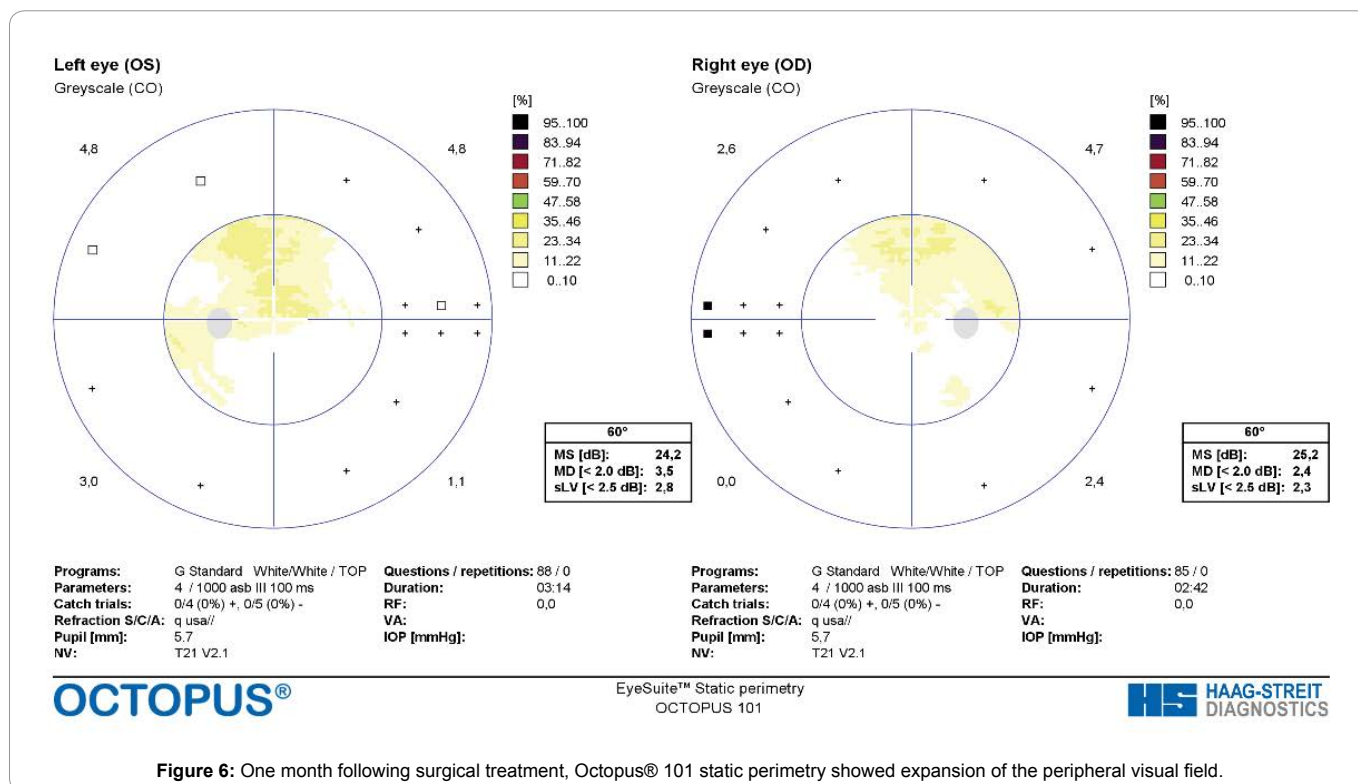


Figure 6: One month following surgical treatment, Octopus® 101 static perimetry showed expansion of the peripheral visual field.

Table 1: Clinical features of muslin-induced optic neuropathy. ACoA - anterior communicating artery aneurysm.

Author	Age	Sex	Aneurism location	Post-op time to symptoms (moths)	Ophthalmic symptoms	Treatment	Outcome
Taravati 2006 <sup>15</sup>	52	M	ACoA	9	Decreased VA	Steroids	Improvement
Yoon 2010 <sup>3</sup>	51	M	ACoA	15	Visual field defect	None	Improvement
Yoon 2010 <sup>3</sup>	52	F	ACoA	13; 24	Decreased VA	Steroids; None	Improvement with relapse
Fitzgerald 2012 <sup>16</sup>	45	M	Not reported	5	Decreased VA	Steroids	Improvement
Bonhomme 2016 <sup>17</sup>	59	F	ACoA	40	Decreased VA OS junctional scotoma	Steroids	Improvement

surgery, patients should be observed regularly during this period for evidence of visual symptoms.

Spectral Domain Optical Coherence Tomography (SD-OCT) has become an essential tool for the neuro-ophthalmologist [19]. This technique is invaluable in quantifying optic nerve impairment and potential indication for surgery.

There is also evidence of distinctive patterns of change in optic nerve head morphology and RNFL loss associated with compressive optic neuropathy. As patent in our case, compressive optic neuropathies appear to demonstrate correspondingly more thinning nasally and temporally when compared with open angle glaucoma [20].

## Conclusion

A MION is an infrequent but serious complication of a chronic inflammatory reaction in response to muslin gauze wrapping. Although rare, this diagnosis should be suspected in any case of visual loss following cerebrovascular surgery where muslin gauze was used.

The optimum management when visual loss occurs remains controversial, however, as our case displays, surgical approach with biopsy and decompression was a correct option.

## Compliance with Ethical Standards

The present Case Report was presented as a scientific poster during the 13th Meeting of European Neuro-Ophthalmological Society (EUNOS), Budapest 10-13 September 2017.

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This study was not funded by any grant.

## Conflict of Interest

The authors declare that they do not have any conflict of interest.

## Ethical approval

This article does not contain any studies with human participants or animals performed by any of the authors.

## Informed consent

Informed consent was obtained from all individual participants included in the study.

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