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Original article

# Binocular diplopia in a tertiary hospital: Aetiology, diagnosis and treatment☆,☆☆

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ABSTRACT

*Objective:* To study the causes, diagnosis and treatment in a case series of binocular diplopia.
*Material and method:* A retrospective chart review was performed on patients seen in the Diplopia Unit of a tertiary center during a one-year period. Diplopia was classified as: acute ≤1 month since onset; subacute (1–6 months); and chronic (>6 months). Resolution of diplopia was classified as: spontaneous if it disappeared without treatment, partial if the course was intermittent, and non-spontaneous if treatment was required. It was considered a good outcome when diplopia disappeared completely (with or without treatment), or when diplopia was intermittent without significantly affecting the quality of life.
*Results:* A total of 60 cases were included. The mean age was 58.65 years (60% female). An acute or subacute presentation was observed in 60% of the patients. The mean onset of diplopia was 82.97 weeks. The most frequent aetiology was ischemic (45%). The most frequent diagnosis was sixth nerve palsy (38.3%), followed by decompensated strabismus (30%). Neuroimaging showed structural lesions in 17.7% of the patients. There was a spontaneous resolution in 28.3% of the cases, and there was a good outcome with disappearance of the diplopia in 53.3% at the end of the study.
*Conclusions:* The most frequent causes of binocular diplopia were cranial nerve palsies, especially the sixth cranial nerve, followed by decompensated strabismus. Structural lesions in imaging tests were more than expected. Only one third of patients had a spontaneous resolution, and half of them did not have a good outcome despite of treatment.



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## Diplopía binocular en un hospital terciario: etiología, diagnóstico y tratamiento

*Palabras clave:*
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Estrabismos descompensados
Parálisis nervios craneales
Pruebas de neuroimagen
Resolución espontánea

RESUMEN

*Objetivo:* Estudiar las causas, el diagnóstico, el tratamiento y los resultados de una serie de casos con diplopía binocular.

*Material y método:* Estudio retrospectivo de pacientes referidos a consulta de diplopía del servicio de oftalmología durante un año. La diplopía se clasificó en aguda ≤1 mes desde su inicio, subaguda (1-6 meses) y crónica (>6). La resolución de la diplopía se consideró espontánea si desaparecía sin necesidad de tratamiento, parcial cuando quedaba intermitente y no resolución espontánea cuando se necesitó tratamiento. Se consideró buen resultado cuando desaparecía por completo la diplopía con/sin tratamiento o era intermitente sin afectar a la calidad de vida del paciente.

*Resultados:* Un total de 60 casos fueron incluidos. La edad media fue 58,65 años (60% mujeres). El 60% fueron agudas o subagudas. La evolución media de la diplopía fue 82,97 semanas. La etiología más frecuente fue isquémica en el 45%. La parálisis del sexto nervio fue el diagnóstico más frecuente: 38,3%, después estrabismos descompensados: 30%. Se encontraron lesiones en las pruebas de neuroimagen en un 17,7%. La resolución espontánea se produjo en un 28,3%. El 53,3% presentó un buen resultado con desaparición de la diplopía al final del estudio.

*Conclusiones:* Las causas más frecuentes de diplopía binocular fueron las parálisis de los nervios craneales, especialmente del VI, seguidas de estrabismos descompensados. Se encontraron lesiones estructurales en las pruebas de imagen en un porcentaje importante. Solo en un tercio de los pacientes la diplopía se resolvió espontáneamente y la mitad tuvo un mal resultado a pesar del tratamiento.



## Introduction

Binocular diplopia, i.e., the perception of 2 images of a single object that disappears when closing one eye,[1] is an uncomfortable and infrequent although potentially serious symptom because it can be caused by pathological processes which could endanger life and vision (tumors, aneurysms, brain hemorrhage, giant cell artheritis, etc.).[2–5] The diagnostic of binocular diplopia is a challenge for ophthalmologists as it requires a very thorough and detailed examination to evidence the cause of double vision in order to propose the most adequate therapeutic strategies.[5–7] Binocular diplopia is more frequent (75–88.5%) than monocular diplopia.[2,8]

The literature does not comprise many papers on the incidence and causes of binocular diplopia. Mechanisms causing this disorder include central nervous system diseases (palsy of cranial nerves III, IV and VI),[9] compromise of neuromuscular, muscular and orbital interface and of binocular vision.[10] The majority of cases (53–67%) are caused by isolated palsy of cranial nerves.[2,3] Only approximately 5% of acute diplopia exhibit severe underlying causes requiring urgent treatment.[3] The need to carry out neuroimaging tests remains controversial to this date[11,12] because adequate anamnesis and exhaustive ocular clinic and neurological examinations are able to reveal the cause in 70% of cases.[3] Treatment of binocular diplopia ranges from ocular reclusion and botulin toxin in the early phases to prisms and surgery depending on the magnitude of deviation in chronic situations as well as opaque contact lenses in untreatable diplopia cases.[13–17]

The purpose of the present study is to analyze the causes, diagnostic, treatment and results of a series of cases with binocular diplopia.

## Material and methods

A retrospective study of patients with double vision referred to the diplopia practice of the Ophthalmology Department of a General Tertiary Hospital during a one-year period. The study was approved by the Ethical Committee of the hospital and the data were collected in accordance with the Helsinki protocol.

The study included all binocular diplopia cases who first visited the practice after being referred. The patients who exhibited monocular diplopia after ocular examination by neuro-ophthalmology and ocular motility experts were excluded from the study. The following data were collected: age, sex and evolution time from the onset of double vision up to examination in the diplopia practice. Diplopia was classified as acute if ≤1 month had elapsed since onset, subacute (1–6 months) and chronic (>6).

General and ophthalmological anamnesis was performed, including the presence of vascular risk factors (diabetes, hypertension, dyslipidemia, alcohol and tobacco consumption, etc.), other personal history such as neoplasia, traumatism, neurological disease, use of medicaments with central action, strabismus during childhood, previous ocular