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Clinical Profile of Proptosis in Dr. M. Djamil General Hospital Padang

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ABSTRACT

Background. Proptosis is a condition that describes a protrusion or forward shift of the eyeball and is commonly used to describe the condition of protrusion of the eyeball. Proptosis generally occurs due to a mismatch between the orbital capacity and the volume of the tissue structure in the orbital cavity. It is a common manifestation of a wide variety of diseases of the structures in and around the orbit and in some systemic diseases. This study aimed to describe the clinical profile of proptosis patients in Dr. M Djamil General Hospital Padang. **Methods:** We reviewed the medical record of the oncology subdivision of ophthalmology patients associated with proptosis retrospectively, such as inflammatory, infectious, tumors, and vascular, admitted to the M.Djamil General Hospital in Padang from January 2019 to August 2020. The ocular and systemic history and examination details were recorded. **Results:** We found 48 proptosis patients from January 2019 to August 2020, consisting of 30(62.5%) males and 18(37,5%) females. The majority of subjects were in the Adult age group (79,17%). Unilateral and bilateral proptosis were found in 37(77%) and 11(23%), with mostly axial proptosis (83,33%). Inflammatory tumors were found in 17(35,41) and 29(60%) patients. **Conclusion:** Proptosis is a common clinical feature of various local and systemic diseases. Even though proptosis have diverse etiology and pathogenesis, they usually present with similar clinical manifestation. Proptosis may be one of the most important keys to disease guidance from a close structure that requires a multidisciplinary approach.

1. Introduction

Proptosis is a condition that describes a protrusion or a forward displacement of the eyeball and is commonly used to describe the protrusion of the eyeball. Proptosis generally occurs due to a mismatch between orbital capacity and the volume of tissue structures in the orbital cavity.^{1,2,3} Eyeball protrusion is the position of the eyeball in the orbital cavity that is obtained by measuring the distance between the anterior part of the cornea and the lateral orbital rim. The protrusion value of the eyeball is obtained by exophthalmometric examination. The examination is a routine and simple examination, non-invasive, inexpensive, and easy to mobilize. This examination is performed on patients suspected of having disease or abnormalities in orbit.^{1,2,4,5}

The absolute protrusion value of the eyeball is the protrusion value compared to the existing standard. The relative value is the asymmetric protrusion between the eyes. If no other clinical abnormalities are found, orbital abnormalities can be estimated if the exophthalmometric value is more than 2 mm. The comparative value is the change in the protrusion value at the time of further examination. This value can monitor the progress of the orbital disease through serial examination.^{1,2,4,5} In general, there are 4 groups of causes of proptosis, namely, an extension of inflammation to orbit; orbital invasion by new tissue growth; impaired venous return from the orbit; and orbital foreign body, e.g., due to trauma.

2. Methods

This study is an observational study. The data used in this study is secondary data in the form of medical records of patients treated in the oncology subdivision, Department of Ophthalmology, Dr. M. Djamil General Hospital, Padang, from January 2019 to August 2020. The criteria for inclusion of research are in the form of medical records of patients diagnosed with proptosis and complete medical records. A total of 48 medical records were sampled in this study. Data were collected retrospectively based on the medical records of patients retrospectively related to proptosis such as inflammation, infection, tumor, and vascular treatment.

3. Results

The research subjects who met the inclusion and exclusion criteria in this study were 48 people with 59 proptosis eyes. Distribution of research subjects by gender, consisting of 30 (62.5%) males and 18 (37.5%) females (table 1). Subjects in this study were divided into age groups infants: 0-1 years, children: 2-10 years, adolescents: 11-19 years, adults: 20-60 years, elderly: above 60 years. The distribution of research subjects based on age showed that the most distribution was in the adult age group, namely 38 subjects (79.17%), while the elderly were 6 subjects (12.5%) and 4 subjects (8.33%) in the group. the age of the children (Table 1).

Table 1. Characteristics of research subjects (n=48).

Characteristics	N (%)
Gender	
Male	30 (62,5%)
Female	18 (37,5%)
Age	
Infants: 0-1 years old	0 (0%)
Children: 2-10 years old	4 (8,33%)
Adolescents: 11-19 years old	0 (0%)
Adult: 20-60 years old	38 (79,17%)
Elderly: > 60 years old	6 (12,5%)

Table 2. Distribution of proptosis based on laterality and type of proptosis (n=48).

Proptosis	N (%)
Laterality	
Unilateral	37 (77%)
Bilateral	11 (23%)
Type	
Axial	40 (83,33%)
Non-Axial	8 (16,67%)

The distribution of cases of proptosis based on laterality and type of proptosis is shown in table 2. Unilateral proptosis among 37 subjects (77%) was more than bilateral proptosis, namely 11 (23%) subjects, with the majority found axial type (83.33%) compared to non-axial proptosis (16.67%) (Table 2). In general,

the etiology that caused proptosis in this study was a tumor which was 29 (60.42%) patients, followed by 17 (35.41%) patients with inflammatory and infectious etiology, and a small number of patients associated with vascular causes (4.17%) (Table 3).

Table 3. Etiology of proptosis (n=48)

Etiology	Results
Tumor	29 (60,42%)
Inflammation and infection	17 (35,41%)
Vascular	2 (4,17%)

4. Discussion

Orbital pathology often presents with symptoms of proptosis. Proptosis is a protrusion abnormality. Proptosis is defined as a forward displacement of the eyeball beyond the orbital margin. Symptoms of proptosis reflect an increase in orbital volume, whereas the direction of proptosis indicates the location of the lesion causing proptosis. The term proptosis is often confused with exophthalmos.^{1,2,3,4}

According to Henderson, exophthalmos has the same meaning as proptosis, but the term exophthalmos is more often used to describe a shift in the eyeball caused by thyroid disease (an endocrine disorder).⁵ The value of eyeball protrusion can be obtained by performing an exophthalmometric examination. Exophthalmometry is an important examination technique in the evaluation of patients with orbital abnormalities. Generally, an asymmetry of 2 mm or greater between the protrusions of the patient's eyes is considered abnormal.^{1,2,4,5}

Proptosis is a common clinical symptom of various diseases that affect the structures in and around the orbit. The orbit consists of the orbital fascia, eye muscles, eyeball and adnexa, arteries, veins, nerve fibers, and fat. The orbital cavity is formed by 7 bones, namely: os. Frontalis, os. Zygomaticus, os. Maxillary, os. ethmoidal, os. sphenoidal, os. Lacrimal and os. Palate. These bones form the orbital cavity into 4 sides, namely: the roof of the orbit, the floor of the orbit, the medial wall, and the lateral wall. The orbit is in close contact with the surrounding cranial, nasal, and paranasal sinuses, making it susceptible to many disturbances that may involve the orbit.⁶

In this study, subjects with male proptosis (62.5%) were found to be more than women (37.5%), with the highest age group being the adult age group (adult) with 79.17% (38 subjects), followed by the adult age group. Elderly (elderly) as many as 12.5% (6 subjects) and the age group of children (children) as much as 8.33% (4 subjects). These results are comparable to the findings of Khan et al.⁷ and Sharma et al.⁸, where they found a 2:1 male-to-female ratio. In that study, a high percentage of males were traumatized and infected, which was attributed to the statement that males were

more involved in trauma-risky work and aggressive play.^{7,8} However, Zaidi⁹ found female predominance (1.1:1) while Otulana et al.³, Naidu et al.¹⁰, and Kishor and Saptua Chingsuingamba¹¹ found an equal sex distribution in their study. The incidence of proptosis by sex and age may vary depending on the underlying cause. In adulthood, orbital inflammation due to endocrine disorders (Graves' ophthalmopathy) is the most common cause of proptosis, where the risk of Graves' ophthalmopathy is 5 times greater in women. As for children, the most common cause of proptosis is orbital cellulitis.^{3,10,11}

Unilateral proptosis 37 subjects (77%) was more than bilateral proptosis, namely 11 (23%) subjects, with the majority found axial type (40 subjects / 83.33%) compared to non-axial proptosis 8 subjects / 16.67%). In the literature and studies on unilateral proptosis, less than one-third of patients have Graves' ophthalmopathy, whereas 45-90% of cases of bilateral proptosis are the result of Graves' ophthalmopathy.⁸ Sudden unilateral onset suggests intraorbital hemorrhage (which may occur after surgery, retrobulbar injection, or trauma) or inflammation of the orbit or paranasal sinuses. Onset 2 to 3 weeks suggests chronic inflammation or orbital inflammatory pseudotumor (non-neoplastic cellular infiltration and proliferation); later onset suggests orbital tumor.^{7,8,9,10}

For adults, the most common causes of unilateral and bilateral proptosis are thyroid-related eye disease or Graves' ophthalmopathy. In children, orbital cellulitis is the most common cause, whereas bilateral proptosis is most likely due to neuroblastoma and leukemia.^{1,2,3,4}

Generally, proptosis originates from four possible etiologies:^{1,3,4,12} extension of inflammation into orbit, e.g., thyroid-associated eye disease, orbital cellulitis, sarcoidosis, granulomatosis with IgG4-associated disease polyangiitis; orbital invasion by new tissue growth, e.g., benign or malignant orbital tumors occupying space such as capillary hemangioma, neuroblastoma, neurofibromatosis, leukemia, lymphoma, mucocele, pseudotumors, and secondary metastatic deposits; impaired venous return from the orbit, e.g., orbital varices, carotid-cavernous fistula,

cavernous sinus thrombosis, and orbital foreign body, e.g., due to trauma.^{1,3,4,12}

In this study, the most common etiology of proptosis was a tumor, which was 60.42%, while inflammatory and infectious etiology was 35.41%, and vascular was 4.17%. Masud et al.¹³ and Sabharwal et al.¹⁴ found neoplasms as the most common cause of proptosis, accounting for 28%.^{13,14} The results of this study are also the same as those found by Ogbeide et al.¹⁵, who found a high percentage of tumors (81.8%). The high variation in proptosis results due to these tumors may be due to their study being a radiological study. Moreover, most of the tumors seen in their study were extra-orbital tumors with secondary orbital involvement.^{13,14,15} Similarly, Komolafe et al.¹⁶ found that proptosis contributed to 53.8% of eye referrals from ear, nose, and throat (ENT) wards in tertiary hospitals, with 42.6% diagnosed with sinonasal tumors.¹⁶ The proximity of the orbit to other craniofacial structures makes it susceptible to this effect. Thus, proptosis may be one of the important keys to disease clues of adjacent structures that require a multidisciplinary approach.^{5,6,16}

Evaluation of onset can provide clues to the diagnosis. Sudden unilateral onset suggests intraorbital hemorrhage (which may occur after surgery, retrobulbar injection, or trauma) or inflammation of the orbit or paranasal sinuses. Onset 2 to 3 weeks suggests chronic inflammation or orbital inflammatory pseudotumor (non-neoplastic cellular infiltration and proliferation); later onset suggests orbital tumor.^{1,2,4,17}

Typical eye examination findings of hyperthyroidism, including eyelid retraction, lagging eyelid movement, a temporal flare of the upper eyelid, and eye-bulging, may be used as an initial screening for the etiology of inflammatory proptosis in Graves' ophthalmopathy. Other signs include eyelid erythema and conjunctival hyperemia. The surface of the eyeball is another thing that must be of particular concern in the condition of proptosis. Exposure to a larger than the normal surface area of the eyeball in the condition of proptosis for a long time causes dryness of the cornea and can lead to infection and ulceration that

results in eye defects, decreased visual acuity, and decreased quality of life.^{4,10,18,19}

There are several things that become a concern when finding people with proptosis, namely: eye pain or redness; headache; decreased visual acuity; diplopia; fever, pulse, and age of the neonate. Proptosis can be confirmed by exophthalmometry, which measures the distance between the lateral angles of the bony orbits and beyond; average values are <20 mm for the white race and <22 mm for the black race. CT or MRI is often useful to confirm the diagnosis and identify the structural cause of unilateral proptosis. Thyroid function testing is indicated when Graves disease is suspected.^{1,2,4,10}

Lubrication to protect the cornea is necessary in severe cases. If lubrication is insufficient, surgery to reduce proptosis and to provide protection against corneal exposure may be necessary. Systemic corticosteroids (e.g., prednisone 1 mg/kg orally once daily for 1 week, tapering-off for 1 month) are often helpful in controlling orbital edema and congestion due to thyroid eye disease or orbital pseudotumor inflammation. Other interventions vary by etiology.^{1,10,13,20}

5. Conclusion

Proptosis is a common clinical feature of various local and systemic diseases. Although proptosis has various etiologies and pathogenesis, it usually presents a similar clinical picture. The most common cause of unilateral proptosis in adults is tumors, whereas bilateral proptosis is Graves' disease. Acute unilateral proptosis suggests infection or vascular compromise (e.g., hemorrhage, fistula, cavernous sinus thrombosis). Chronic unilateral proptosis indicates the presence of a tumor. Perform CT or MRI and thyroid function tests if Graves' disease is suspected. Proptosis may be one of the important key clues for the disease of adjacent structures, which requires a multidisciplinary approach. The exposed corneal lubrication is important in overcoming the complications of proptosis on the health of the ocular surface.

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