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Clinical Characteristics of Post-surgical Ptosis Patients at Dr. Mohammad Hoesin General Hospital Palembang

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A B S T R A C T

Introduction: Blepharoptosis is drooping of the upper eyelid in a primary position, causing the narrowing of the palpebral fissure. This condition can partially or completely cover the visual axis. Establishing the diagnosis of ptosis requires a comprehensive eye examination, including history taking, physical examination, and examination of the eyelids in ptosis patients. The majority of patients with ptosis require surgery, and clinical characteristics play an important role in classifying the type of ptosis and then formulating a detailed treatment plan strategy so that a better outcome is obtained. **Methods:** A descriptive retrospective study was conducted from medical records of post-surgical ptosis patients at Dr. Mohammad Hoesin Hospital Palembang from January 2016 to December 2021. The data taken included age, gender, the onset of occurrence, laterality, type of ptosis based on the onset, vertical palpebral fissure (FPV), horizontal palpebral fissure (FPH), margin-reflex distance (MRD), margin limbal distance (MLD), lid lag, bell's phenomenon levator muscle function, type of ptosis surgery and postoperative condition. This study aims to determine the clinical characteristics of patients with ptosis at Dr. Mohammad Hoesin Hospital Palembang. **Results:** Of the 57 ptosis patients in this study, the majority of patients were male, as many as 32 patients (56.1%) with the age category >40 years, as many as 24 patients (42.1%) with unilateral lateral ptosis as many as 50 patients (87.7%) with the more frequent comparison was the left eye in 29 patients (58%). Acquired ptosis was the most common cause in this study in as many as 46 patients (80.7%), and the most common mechanism of acquired ptosis was neurogenic (33.3%). The majority of patients had no previous surgical history of 41 patients (71.9%), moderate levator function of as many as 42 (73.7%), and frontal suspension surgery technique with synthetic materials as many as 17 (34%) patients. the mean FPV was 5.08±2.627 with a median of 5.00 (0-11), FPH 25.94±1.726 with a median of 26.00 (20-29), MRD 0.246±1.78 with a median of 0.00 (-4 -5), MLD 4.789±2.801 with a median of 5.00 (-4-11) and LA 7.16±4.083 with a median of 7.00 (0-14). Ptosis patients had negative lid lag in 47 patients (82.5%) and positive bell's phenomenon in 49 patients (86%). The postoperative condition of ptosis patients was satisfactory where there was no recurrence and reoperation of ptosis, postoperative complications as many as 1 (1.8%) patients experienced overcorrection, 6 (10.5%) patients experienced lagophthalmos, and 2 (3.5%) patients had an outcome. asymmetric. **Conclusion:** Clinical characteristics of ptosis patients can determine the diagnosis and treatment that will be given to the patient.

1. Introduction

Blepharoptosis, also known as ptosis, is the drooping of the upper eyelid in a primary position, causing the narrowing of the palpebral fissure. This condition can partially or completely cover the visual axis. Ptosis is a common cause of reversible peripheral vision loss, but it has also been shown that ptosis can reduce the total amount of light reaching the macula and, therefore, can reduce visual acuity, especially at night. [1–3]

Upper eyelid ptosis can be classified on the basis of

onset as congenital or acquired. Ptosis can be further categorized according to its cause: (1) myogenic, (2) aponeurotic, (3) neurogenic, (4) mechanical, or (5) traumatic. The most common type of congenital ptosis is myogenic, resulting from an underdeveloped levator palpebra superioris muscle; The most common type of acquired ptosis is aponeurosis and is caused by stretching or disinsertion of the levator aponeurosis.[3]

Establishing the diagnosis of ptosis requires a comprehensive eye examination, including history taking, physical examination, and examination of the eyelids in ptosis patients. Examination of the eyelids such as margin-reflex distance (MRD) 1 and 2, vertical palpebral fissure height, the position of the upper eyelid crease, levator function (upper eyelid excursion), and bell's phenomenon or lagophthalmos.[3] Another evaluation that can be done is the Goldmann visual field. Test, Humphrey visual field test, and Leicester peripheral field test (LPFT).

Most cases of patients with ptosis require surgery, and clinical characteristics play an important role in classifying the type of ptosis and then formulating a detailed treatment plan strategy so that a better outcome is obtained.[4] The purpose of this study was to determine the clinical characteristics of patients with ptosis at Dr. Mohammad Hoesin General Hospital Palembang.

2. Methods

This research is a retrospective descriptive study. The study data was taken from the medical records of post-ptosis surgery patients from January 2016 to December 2021 at Dr. Mohammad Hoesin General Hospital Palembang. The inclusion criteria were all ptosis patients who underwent surgical management at Dr. Mohammad Hoesin General Hospital Palembang. Exclusion criteria in this study were patients who did not come for control at 1 week after ptosis surgery and medical records of post ptosis surgery patients with incomplete data.

The data taken included age, gender, onset of occurrence, laterality, type of ptosis based on the onset, fissure palpebral vertikal (FPV), fissure palpebral horizontal (FPH), margin-reflex distance (MRD), margin limbal distance (MLD), lid lag, bell's phenomenon levator muscle function, type of ptosis surgery and postoperative condition. Ptosis is classified into mild (1-2mm), moderate (3-4mm), or severe (>4mm). Palpebral vertical fissure (FPV) is the distance between the edge of the upper eyelid and the edge of the lower eyelid. Horizontal Palpebral Fissure (FPH) is the distance between the medial and lateral canthus. Margin Reflex Distance (MRD) is the distance between the edge of the upper eyelid and the corneal reflex. Margin Limbal Distance (MLD) is the distance between the edge of the upper eyelid and the edge of the lower limbs when the patient looks up. Examination of the patient's eyelids was measured with a ruler in millimeters (mm). Bell's phenomenon is an examination to determine complications that can occur after the surgery to be performed where the patient is asked to close both eyes as hard as possible, and the examiner tries to open them. Levator muscle function is the difference in distance measured at the palpebral fissure margin taken before surgery and after ptosis surgery. Data on recurrence and reoperation were also taken.

The types of ptosis in this study were divided based on the onset, which included congenital or acquired, which were further categorized based on the etiology of aponeurotic, myogenic, traumatic, neurogenic, mechanical, and pseudoptosis. The degree of ptosis was divided into mild grade if the upper eyelid drooped 1-2 mm, moderate grade if the upper eyelid decreased 3-4 mm, and severe grade if the decrease was > 4 mm. The levator muscle function in this study was divided into good if the levator muscle function was >12 mm. Moderate said the levator muscle function was 4-12 mm, and poor if <4 mm. The research data were entered into Microsoft Excel 2016 and then analyzed using SPSS version 24.

3. Results

In this study, there were 57 patients with ptosis who had undergone ptosis surgery from January 2016 to December 2021 and who had met the inclusion and

exclusion criteria. Table 1 shows the demographic data of patients, where the comparison of the number of male patients, as many as 32 patients (56.1%), is greater than that of women with 25 patients (43.9%). The median age in this study was 30 years with an average age of 34.86 ± 21.9 years, and the highest age category was >40 years with 24 patients (42.1%).

Table 1. Demographic data and clinical characteristics

	Number of Patients (n)	**Percentage (%)**
Gender		
Male	32	56.1%
Female	25	43.9%
Age	Median 30 years, Mean ± SD 34.86 ± 21.9 years	
0-18 years	16	28.1%
19-40 years	17	29.8%
>40 years	24	42.1%

Table 2 shows that the majority of lateralization ptosis in this study was unilateral ptosis in 50 patients (87.7%) compared to bilateral ptosis in 7 patients (12.3%), with a more frequent comparison of the left eye in unilateral ptosis cases in 29 patients (58%). Acquired ptosis was the most common cause in this study, with as many as 46 patients (80.7%). The mechanism of acquired ptosis in this study was mostly neurogenic (33.3%) and followed by myogenic (26.3%) and mechanical (21.1%). The majority of ptosis degrees in this study were severe ptosis, with as many as 33 patients (57.9%). In this study, the majority of patients had no previous surgery history of 41 patients (71.9%). The majority of levator function in ptosis patients in this study was moderate. As many as 42 (73.7%) patients had a levator function of 4-12 mm.

Table 2. Clinical characteristics

	Number of Patients (n)	**Percentage (%)**
Lateralization		
Bilateral	7	12.3%
Right	4	57.1%
Left	3	42.9%
Unilateral	50	87.7%
Right	21	42%
Left	29	58%
Etiology of Ptosis		
Congenital	11	19.3%
Acquired	46	80.7%
Mechanism of Ptosis		
Aponeurotic	5	8.8%
Myogenic	15	26.3%
Traumatic	6	10.5%
Neurogenic	19	33.3%
Mechanical	12	21.1%
Previous Operation History		
Yes	16	28.1%
No	41	71.9%
Degree of Ptosis		
Mild	10	17.5%
Moderate	14	24.6%
Severe	33	57.9%
Levator Function		
Good	6	10.5%
Moderate	42	73.7%
Poor	9	15.8%

Levator function can be a determinant in the choice of surgical technique in ptosis patients. The most common surgical technique for ptosis patients in this study was frontal suspension with synthetic materials for as many as 17 (34%) patients and followed by the levator resection technique for as many as 16 (32%) patients. Another repair technique used is socket repair OD with DFG in 2 patients with mechanical ptosis.

Table 3. Surgical technique

	Number of Patients (n)	**Percentage (%)**
Surgical Technique		
Fasaanella Servat	2	3.5%
Mullerectomy	10	17.5%
Levator Advancement	5	8.8%
Levator Resection	17	29.8%
Frontalis Suspension with Synthetic Material	19	33.3%
Frontalis Suspension with Autograft (fascia lata)	2	3.5%
Others	2	3.5%

Examination of the eyelids of ptosis patients before surgery in this study included FPV, FPH, MRD, MLD, LA, lid lag, and bell's phenomenon. Based on table 4, the average FPV result is 5.08±2.627 with a median value of 5.00 (0-11). The mean FPH of ptosis patients was 25.94±1.726, with a median value of 26.00 (20-29). The mean MRD of ptosis patients was 0.246±1.78, with a median value of 0.00 (-4-5). The mean MLD of ptosis patients was 4.789±2.801 with a median value of 5.00 (-4-11) and a mean LA of 7.16±4.083 with a median value of 7.00 (0-14). In this study, the majority of ptosis patients had negative lid lag, as many as 47 patients (82.5%), and positive bell's phenomenon, as many as 49 patients (86%).

Table 4. Examination of the eyelids of ptosis patients

	Mean±SD	**Median (Minimum-maximum)**
FPV	5,08±2,627	5,00 (0-11)
FPH	25,94±1,726	26,00 (20-29)
MRD	0,246±1,78	0,00 (-4-5)
MLD	4,789±2,801	5,00 (-4-11)
LA	7,16±4,083	7,00 (0-14)
	Number of Patients (n)	**Percentage (%)**
Lid lag		
Negatif	47	82.5%
Positive	10	17.5%
Bell's Phenomenon		
Negative	8	14%
Positive	49	86%

Based on table 5, it was found that the postoperative condition of ptosis patients in this study was quite satisfactory, where there was no recurrence and reoperation of ptosis. In this study, postoperative complications were found in ptosis patients, where as many as 1 (1.8%) patients had overcorrection, 6 (10.5%) patients had lagophthalmos and 2 (3.5%) patients had asymmetric outcomes.

Table 5. Conditions and complications post ptosis surgery

	Number of Patients (n)	Percentage (%)
Recurrence		
Yes	0	0%
No	57	100%
Reoperation		
Yes	0	0%
No	57	100%
Under Correction		
Yes	0	0%
No	57	100%
Over Correction		
Yes	1	1.8%
No	56	98.2%
Lagophthalmos		
Yes	6	10.5%
No	51	89.5%
Asymmetric		
Yes	2	3.5%
No	55	96.5%

4. Discussion

Ptosis is one of the most common disorders of the upper eyelid. The number of post-ptosis surgery patients at Dr. Mohammad Hoesin Hospital between 2016 and 2020 was 57 cases. The majority of ptosis patients in this study were male. This is similar to the results of studies conducted by Sartika TD et al. and Lee YG et al., which found that ptosis was more common in males than females. According to Alamou et al. research, this may be due to the high risk of accident-related trauma, which is one of the risk factors for ptosis. The results of Lee C et al. study contradicted the results of this study, where the results of the comparison of females were almost 3 times more than males. However, some literature states that gender is not a factor associated with the incidence of ptosis. Levator muscle weakness or dysgenesis, a history of previous eye surgery or upper eyelid trauma, third nerve weakness, and the presence of an upper eyelid tumor are major predisposing factors for ptosis.[4,5]

The age range of ptosis patients in this study obtained the most results in the age range >40 years. In addition, in this study, the results of the 19-40 years group and the <18 years group were not much different. Research conducted by Hashemi et al. in Iran also found that ptosis occurred as much as 3.1% in the 45 to 49 years age group and 5.8% in the 65 to 69 year age group. Lee C-C et al.'s research got the most results in the age range of 20-39 years.[6] Research Alamou et al. also get results with the most age range less than 20 years. However, with increasing age, the prevalence of ptosis increases. There is no precise explanation for this trend.[7] Rathbun stated that the possible reason for the increasing proportion of acquired ptosis cases was the increased acceptance of reconstructive procedures for the correction of aging changes. Improved socioeconomic status and increased demand for a more aesthetic appearance are believed to have led to an increase in the incidence of acquired ptosis.[4] Cataract surgery which is generally in elderly patients, is also said to be one of the causes. Charlotte and Stuart mentioned in their study that an

individual's susceptibility to a disease tends to increase with age. This is a reflection of changes in physiology, environment, and exposure to genetic factors.[8]

The majority of lateralization of ptosis in this study was unilateral ptosis in 50 patients (87.7%) compared to bilateral ptosis in 7 patients (12.3%), with a more frequent comparison of the left eye in unilateral ptosis cases in 29 patients (58%). The ptosis is often unilateral, in accordance with studies conducted by Alamou et al. and Lee YG et al., who found 43 patients (73.1%) dan 1.466 patients (63%) were unilateral.[4,7] Higher rates were reported by Handor et al. and Hashemi et al., respectively, 90.9% and 95%.[6,9] The study conducted by Lee CC et al. obtained slightly different results from 1975 patients with ptosis laterality of the ptotic eyelids was statistically equivalent (right eye: 49.77%; left eye: 50.23%) (p = 0.8396).[5] The left eye was the most affected in our series because a punch is usually blown with the right hand. Unilateral ptosis was defined as an asymmetry of the palpebral fissure <1 mm (the distance between the upper and lower eyelid in vertical alignment) between two upper eyelids. Bilateral ptosis was defined as a MRD < 2.0 mm of both eyes.[5]

Causes of ptosis based on onset are divided into congenital and acquired. The results in this study are in agreement with the study conducted by Lee CC et al., who obtained that a total of 872 (44.15%) ptotic eyelids were congenital by the time of onset, and 1103 (55.85%) ptotic eyelids had an acquired etiology (p 0.0001).[5] Acquired ptosis is caused by myogenic, neurogenic, aponeurotic, traumatic, mechanical, and pseudoptotic mechanisms. Most of the acquired ptosis treated in this study was the result of neurogenic conditions followed by myogenic and traumatic conditions. Lee CC et al's study found that for the ptosis classification, 1143 eyelids of myogenic ptosis comprised 57.81% of the majority population, followed by aponeurotic ptosis (38.39%), mechanical ptosis (2.38%), and neurogenic ptosis (1.32%) (p 0.0001). There were four cases of mixed-type ptosis, in which two were a combination of myogenic and aponeurotic origin, another with the myogenic and neurogenic origin, and the other showed myogenic and mechanical origin. The majority of myogenic ptosis cases were congenital ptosis (63.70%).[5] Neurogenic forms of congenital ptosis can be caused by cranial nerve III abnormalities or insufficient sympathetic innervation of Müller's muscle. Traumatic conditions can cause disruption of the eyelid or nerve input to the eyelid, causing ptosis. Myogenic ptosis is caused by primary or secondary myopathy of the levator muscle, due, for example, to chronic progressive external ophthalmoplegia (CPEO), oculopharyngeal muscular dystrophy (OPMD), or myotonic dystrophy. Several theories state that Neurogenic ptosis is relatively rare. Among patients with neurogenic ptosis, the most common underlying causes are oculomotor nerve (3rd cranial nerve), palsy (35.7%), myasthenia gravis (28.6%), aberrant regeneration (14.3%), and Horner's syndrome (7.1%).[1] This possible difference needs to be investigated further regarding the accompanying and underlying disease of the ptosis that occurs.

The degree of ptosis is divided according to the drooping of the upper eyelid that occurs in the patient. About 57.9% of ptosis patients in this study had severe ptosis. Lee YG et al. study obtained approximately 40% fewer results in severe ptosis in the congenital ptosis group, and in the ptosis group, the majority had moderate ptosis.[4]

The LF test was performed to assess levator superioris muscle functionality by measuring the upper eyelid excursion from extreme downgaze to upgaze. LF is related to the degree of ptosis. That is, the lower the LF, the greater the eyelid drooping. Classically, acquired ptosis is known to be associated with good LF and less severe lid drooping. The results of the examination of levator function in this study were mostly in the moderate category, as much as 73.7%, with a mean examination result of 7.16 ± 4.083 with a median value of 7.00 (0-14).[1] Levator function in Lee YG et al.'s study showed poor levator function results in the majority of cases of congenital ptosis and levator function in cases of ptosis obtained in the majority in a good category with a mean levator

function of 5.46 ± 3.27 mm.[4] Research conducted by Cicendo Eye Hospital also obtained similar results where the majority of the levator function in this study was in the moderate category as much as 63.7% with an average examination result of 5.62 ± 3.42 mm.[10] Levator function is related to the degree of ptosis where the lower the levator function, the greater the lowering of the upper eyelid. Acquired ptosis is known to be associated with better levator function and less severe upper eyelid drooping when compared with congenital ptosis.

The surgical technique used in the management of ptosis patients is based on the severity of the ptosis and the results of the levator function examination. The most common and widely used ptosis surgical procedure in this study was frontal suspension with synthetic material followed by levator resection. Existing theory and research conducted at Cicendo Eye Hospital also obtained the same results where the two most common techniques for ptosis surgery were levator resection and frontalis sling techniques.[1,10] The frontalis sling technique is performed in severe ptosis with poor levator function and may be indicated for the prevention of amblyopia in ptosis patients. A levator resection technique can be used for moderate ptosis with better levator function. The levator muscle resection to be performed can be based on the results of the levator function examination obtained on a physical examination.

Examination of the eyelids of ptosis patients before surgery in this study included FPV, FPH, MRD, MLD, LA, lid lag, and bell's phenomenon. Another study reported the average LF of Korean patients aged 50 years or older with ptosis as 10.0 mm, a value less than that of Caucasians. This difference in mean ptosis examination may be due to thick orbicularis muscle and prominence of fat tissue in Asians.[4]

5. Conclusion

Multiple cultural and external factors have contributed to the distinct demographic features of blepharoptosis. Clinical characteristics of ptosis patients can provide an overview of the pathophysiology of the disease underlying the patient's ptosis condition. The clinical characteristics of ptosis patients can assist in determining the diagnosis and treatment that will be given to the patient so that the doctor can provide the right diagnosis and treatment as well as good surgical planning in patients with ptosis.

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