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Recurrence ptosis after frontalis suspension: Evaluation of associated factors*

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Background : *Congenital blepharoptosis is a common eyelid problem. The treatment mostly used is frontalis suspension due to poor development of levator muscle. Frontalis suspension can be achieved in many ways such as autogenous fascia lata suspension, frontalis muscle transfer, synthetic material suspension including suture materials. Recurrence can be anticipated anyway in all procedures. Frontalis suspension using suture materials has been done for a long time in King Chulalongkorn Memorial Hospital since most patients were too young to use autogenous fascia lata. We would like to evaluate the recurrence rate and associated factors that influence the outcome.*

Objective : *To study recurrence rate of frontalis suspension procedure and associated factors that influence the outcome.*

Design : *Descriptive study*

Setting : *Department of Ophthalmology, Faculty of Medicine, Chulalongkorn University and King Chulalongkorn Memorial Hospital*

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Material and Method : *Definition of recurrent blepharoptosis, surgical failure, recurrent time were denoted. Twenty-three patients diagnosed with congenital blepharoptosis corrected by primary frontalis suspension using nylon suture material at King Chulalongkorn Memorial Hospital during January 2004 and December 2008 were reviewed. Data collected from surgical records, and variable factors were assessed.*

Results : *Twenty-three eligible patients were recruited into the study. Twelve out of 23 cases had recurrence (52.2%). The age group have association with recurrence (r = 0.3), p = 0.032, [95% CI, 0.006 - 0.802]. The age group $\leq$ 2 years old seemed to have higher recurrence rate in contrast to the age group > 2 years old (68.8% vs 31.2%). Overall median time to recurrence was 27.5 months (SD 15.1), [95%CI, 0-57.0]. There was no statistically significant difference of recurrence rate among patients' age group, gender, laterality and preoperative margin-reflex distance1 (MRD1).*

Conclusion : *Suture frontalis suspension had high recurrence rate with overall median survival time at 27.5 months. However, with nearly 2.5-year-survival, it might benefit very young children who need surgical correction but in whom autogenous fascia lata suspension could not be done. The age group was the only associated factor that influenced the outcome in the study.*

Keywords : *Blepharoptosis, recurrence, frontalis sling, frontalis suspension, congenital.*

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วิมลทิพย์ ลยานันท์, อุไรวัลย์ ตินนังวัฒนะ, ศุภพงศ์ ถิรคุณวิชชะ. ภาวะหนังตาตกที่เกิดซ้ำหลังจากการผ่าตัด Frontalis suspension: การประเมินปัจจัยที่เกี่ยวข้อง. จุฬาลงกรณ์เวชสาร 2556 ม.ค. – ก.พ.;57(1): 13 – 23

เหตุผลของการทำวิจัย : *ภาวะหนังตาตกแต่กำเนิดเป็นปัญหาความผิดปกติของเปลือกตาที่พบได้บ่อย มาตรฐานการรักษาความผิดปกติชนิดนี้ คือ การทำ frontalis suspension เนื่องจากกล้ามเนื้อ levator มีการพัฒนาที่ผิดปกติทำให้ไม่มีแรงในการยกเปลือกตา การทำ frontalis suspension นั้น สามารถทำได้หลายวิธี เช่น frontalis muscle transfer, fascia lata sling หรือ suture material sling การเกิดเป็นซ้ำหลังการทำผ่าตัดเป็นสิ่งที่อาจจะเกิดขึ้นได้ไม่ว่าจะผ่าตัดด้วยวิธีใดก็ตาม การทำผ่าตัดวิธี frontalis suspension โดยการใช้ไหมเย็บ เป็นการผ่าตัด ที่ทำมานานที่ รพ.จุฬาลงกรณ์ เนื่องจากผู้ป่วยยังเล็กเกินที่จะใช้ autogenous fascia lata ผู้วิจัยอยากทราบถึง recurrence rate ของการผ่าตัดวิธีดังกล่าว รวมถึงปัจจัยที่อาจมีผลต่อ outcome*

วัตถุประสงค์ : *เพื่อหาอัตราการเกิดภาวะหนังตาตกซ้ำหลังจากการผ่าตัดด้วยวิธี frontalis suspension และประเมินว่าปัจจัยใดที่มีผลต่อการเกิดภาวะหนังตาตกซ้ำ*

รูปแบบการวิจัย : *การศึกษาเชิงพรรณนา*

สถานที่ทำการศึกษาวิจัย : *ภาควิชาจักษุวิทยา คณะแพทยศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย และโรงพยาบาลจุฬาลงกรณ์*

ตัวอย่างและวิธีการศึกษา : *หลังจากให้คำนิยามของภาวะหนังตาตกซ้ำ surgical failure เวลาที่เกิดหนังตาตกซ้ำ ได้เก็บข้อมูลของผู้ป่วยที่เป็นหนังตาตกแต่กำเนิดที่ได้รับการผ่าตัด frontalis suspension ครั้งแรก จำนวน 23 คนใน รพ. จุฬาลงกรณ์ ตั้งแต่เดือนมกราคม ปี ค.ศ. 2004 ถึงเดือนธันวาคม ปี ค.ศ. 2008 ซึ่งเก็บข้อมูลจากแฟ้มประวัติผู้ป่วยที่ได้รับการผ่าตัด frontalis suspension ด้วยวัสดุไหมและประเมินว่าปัจจัยใดที่มีผลต่อการเกิดซ้ำ*

ผลการศึกษา : *มีผู้ป่วยที่เข้าเกณฑ์การศึกษาจำนวน 23 ราย ผู้ป่วย 12 ใน 23 ราย (52.2%) เกิดภาวะหนังตาตกซ้ำ ปัจจัยด้านอายุมีความสัมพันธ์กับการเกิดซ้ำ (r = 0.3), p = 0.032, [95%CI, 0.006 - 0.802] พบว่าผู้ป่วยที่มีอายุน้อยกว่าหรือเท่ากับ 2 ขวบ มีการเกิดหนังตาตกซ้ำ 68.8 % เมื่อเทียบกับผู้ป่วยที่มีอายุมากกว่า 2 ขวบซึ่งมีการเกิดหนังตาตกซ้ำ 31.2% Overall median survival time คือ 27.5 เดือน (SD 15.1), [95%CI, 0 - 57.0] แต่ไม่พบว่ามีความแตก ต่างอย่างมีนัยสำคัญของการเกิดภาวะหนังตาตกซ้ำระหว่างอายุของผู้ป่วย เพศ ข้างที่ทำผ่าตัด และค่า MRD1 ก่อนการผ่าตัด*

สรุป : *อายุเป็นปัจจัยเดียวที่มีผลต่อการเกิดซ้ำหลังการผ่าตัดในการศึกษานี้ การใช้ไหม nylon ในการผ่าตัด frontalis suspension มีอัตราการเกิดซ้ำค่อนข้างสูง แต่ nylon สามารถอยู่ได้ที่ 27.5 เดือน หรือเกือบ 2.5 ปี ซึ่งอาจมีประโยชน์สำหรับผู้ป่วยเด็กเล็กที่มีข้อบ่งชี้ในการผ่าตัดแต่ยังไม่สามารถผ่าตัดทำ autogenous fascia lata ได้*

คำสำคัญ : *เปลือกตาตก, หนังตาตก, การเกิดเป็นซ้ำ, frontalis sling, frontalis suspension, การเป็นแต่กำเนิด.*

Blepharoptosis is a drooping condition of the eyelid. It can be categorized by the onset as congenital and acquired or by the etiology as myogenic, aponeurotic, neurogenic, traumatic and mechanical. Congenital blepharoptosis is actually myogenic in origin. Unusual myogenic causes such as myotonic dystrophy, chronic progressive external ophthalmoplegia and oculopharyngeal dystrophy were less found. Surgical correction is the mainstay of treatment to alleviate the drooping eyelids, and levator function plays an important role in selecting the surgical techniques. Most cases of congenital blepharoptosis have poor levator excursions regarding maldeveloped muscle substituted by adipose tissue, thus the eyelids cannot be lifted up or drooped down on downgaze (eyelid lag). Poor levator functions were variably defined as less than 3 - 5 mm. The concept to elevate the eyelids is to connect frontalis muscle to tarsus by doing frontalis suspension.[1] The gold standard to perform in poor levator function is autogenous fascia lata suspension. Levator resection or advancement could be done in fair to good levator function.[2] However, young patients can not undergo autogenous fascia lata according to non-fully development. Other materials have been used instead of autogenous fascia lata eg. prolene [3], ePTFE [4, 5], silastic [5], banked fascia lata. [6] We intended to find out the recurrence rate using nylon suture material and assess the factors that might be associated with.

Materials and Methods

Data of the patients with congenital blepharoptosis, who were operated at King Chulalongkorn Memorial Hospital during January 2004 and December 2008 by one surgeon (TU) were collected and analyzed. Frontalis suspension using nylon suture material, patients' age, gender, side and preoperative margin-reflex distance1 (MRD1) were studied. The inclusion criteria were congenital blepharoptosis patients of all ages who had primary operation with more than one-year follow-up period. The indications for surgery were amblyopia, the negative MRD1 and cosmetic concern or children with social problems. Only 23 cases who met the inclusion criteria were analyzed. Definition of factors that affected the measurement were elucidated. The margin reflex distance1 was the distance between the central corneal light reflex and the upper eyelid margin (MRD1). Poor levator function in the current study was defined as having the levator excursion $\leq$ 5 mm. Recurrence was the level of the eyelid margin which returned to the preoperative level or persistent negative to zero MRD1 even with frontalis muscle contraction. Surgical failure was the MRD1 that did not change in the immediate postoperative period without any complications. Recurrent time was the time the surgeon found recurred ptosis or strong evidence of recurrence from parents. Informed consents were obtained from the parents. The study was approved by the Institution Review Board.

Surgical methods

After general anesthesia was performed, the eyelid was marked as two trapezoids having three points marked over the tarsus (medial limbus, central and lateral limbus) or at the same level with non-ptotic contralateral eyelid crease, and three points at the upper border of the eyebrow (head, central and tail of the eyebrow). Scalpel blade #11 was used to incise

the central point of the eyebrow about 3 - 4 mm in length. Nylon suture #2/0 with Wright needle was used, starting at the central wound of the eyebrow, and pointed down vertically to the central marking point over the tarsus of the eyelid. The direction turned horizontally to the medial marking point of the eyelid and back upward to the medial point of the eyebrow, which then turned horizontally towards the central wound of the eyebrow. Suture was tied after appropriate height was adjusted with suture tags left. Another trapezoid was made laterally in the same fashion. Suture tags of the two trapezoids were tied together to secure the knot (Figure 1). The wound was closed with #6/0 silk suture in interrupted fashion.

Statistical analysis

Logistic regression analysis was used to determine the associated factors. The Kaplan-Meier survival analysis was used to analyze the recurrence rate using SPSS version 18. A p-value < 0.05 was considered statistically significant.

Results

Twenty-three cases were recruited analyzed. Age range was between 3 months and 12 years old. Fourteen cases were male, nine were female. All cases were unilateral ptosis in which 15 cases were the right eye and 8 cases were the left (Table1). The mean follow-up time of non-recurrent cases was 32.8 months (SD 17.1). Logistic regression analysis showed that only the age group was associated with recurrence (r = 0.3), p = 0.032, [95% CI, 0.006 - 0.802] whereas gender, MRD1 group did not display any statistically significant difference {(p = 0.7, [95% CI, 0.203-11.162] in gender, p = 0.6, [95% CI, 0.084-4.252] in MRD group}. The age group ≤ 2 years old seemed to have higher recurrence rate in contrast to the age group > 2 years old (68.8% vs 31.2%). The overall median survival time was 27.5 months (SD 15.1), [95% CI, 0 -57.0]. Regarding gender (Figure 2), median survival time of male was 55.2 months (SD 19.4), [95% CI, 17.1-93.2], female was 14.0 months (SD 2.6), [95% CI, 8.9-19.1]; log rank test, p = 0.22. About the age-group (Figure 3), median survival time of age-group ≤ 2 years old was 18.0 months (SD 8.3), [95% CI, 1.7-34.3], age-group > 2 years old did not show median survival time; log rank test, p = 0.07. According to pre-operative MRD1 (Figure 4), median survival time of MRD1 ≤ 0 mm. was 24.0 months (SD 7.6), [95% CI, 9.1-38.9], MRD1

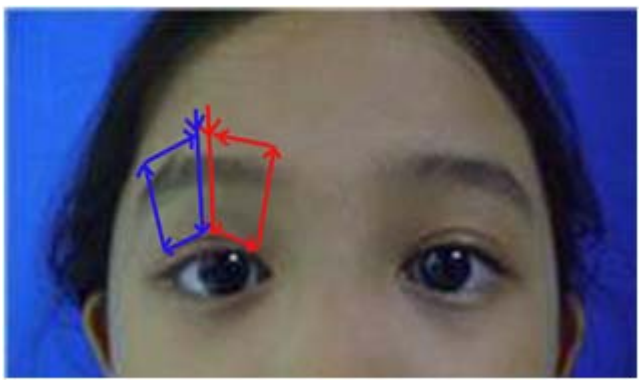

Figure 1. Surgical technique: two trapezoids using nylon and tied above the central point of the eyebrow.

> 0 mm. did not show median survival time; log rank test, p = 0.27. About the laterality (Figure 5), median survival time of the right eye was 55.2 months (SD 26.2), [95% CI, 3.8-106.5], the left eye was 14.0 months (SD 4.1), [95% CI, 6.0-22.0]; log rank test, p = 0.08 (Table 2). The recurrence rate was 52.2% (12/23 cases). Only one complication was found in 1 of 23 cases which was cellulitis at the surgical site that was cured by oral antibiotics.

Table 1. Demographic data and recurrence rate.

Variables	Cases	Recurrence
Gender (%)		
Male	14 (60.9%)	7/12 (58.3%)
Female	9 (39.1%)	5/12 (41.7%)
Laterality (%)		
Right eye	15 (65.2%)	6/15 (40%)
Left eye	8 (34.8%)	6/8 (75%)
Age groupd		
≤ 2 years old	16 (69.6%)	11/16 (68.8%)
>2 years old	7 (30.4 %)	1/7 (31.2%)
MRD1		
MRD1 ≤ 0	14 (60.9%)	8/14 (57.1%)
MRD1> 0	9 (39.1%)	4/9 (44.4%)
Surgical technique	23 (100%)	12/23 (52.2%)

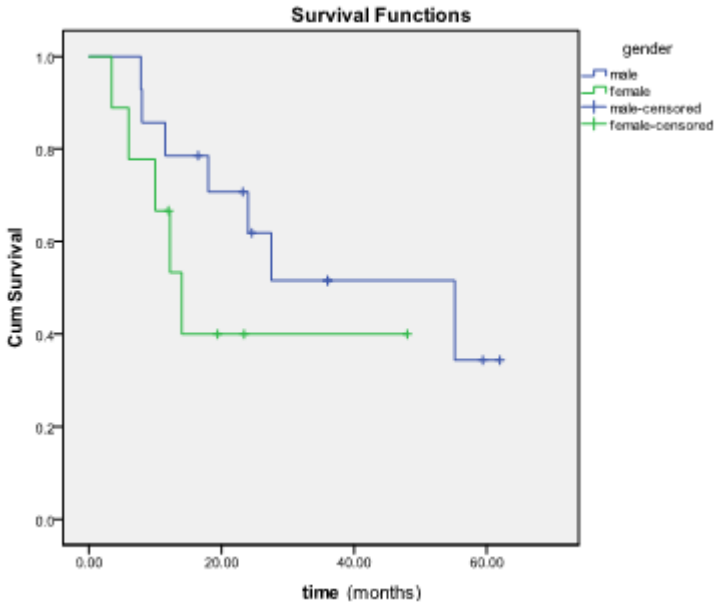

Figure 2. Survival analysis of gender at 5-year follow-up.

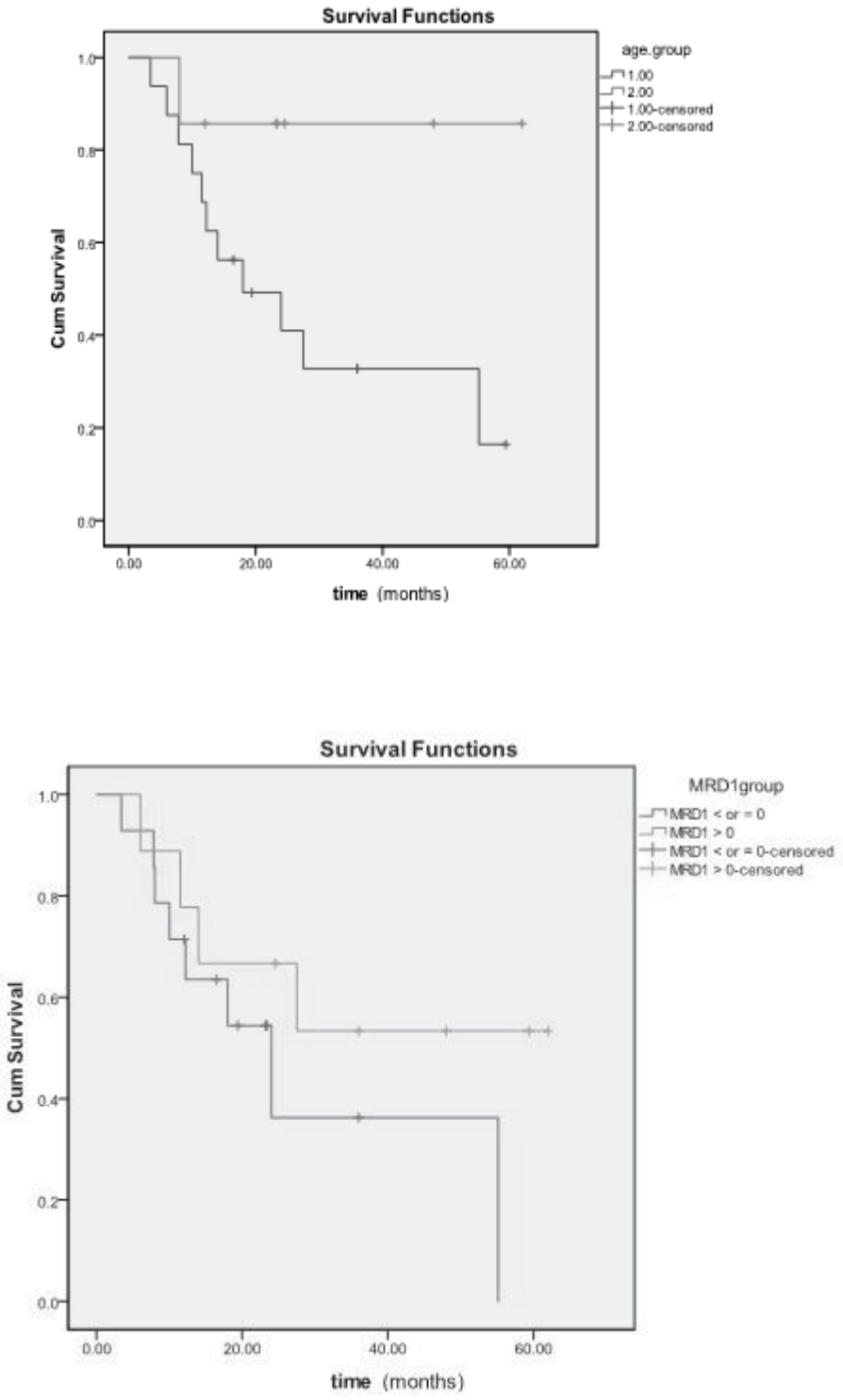

Figure 4. Survival analysis of MRD1 group at 5-year follow-up.

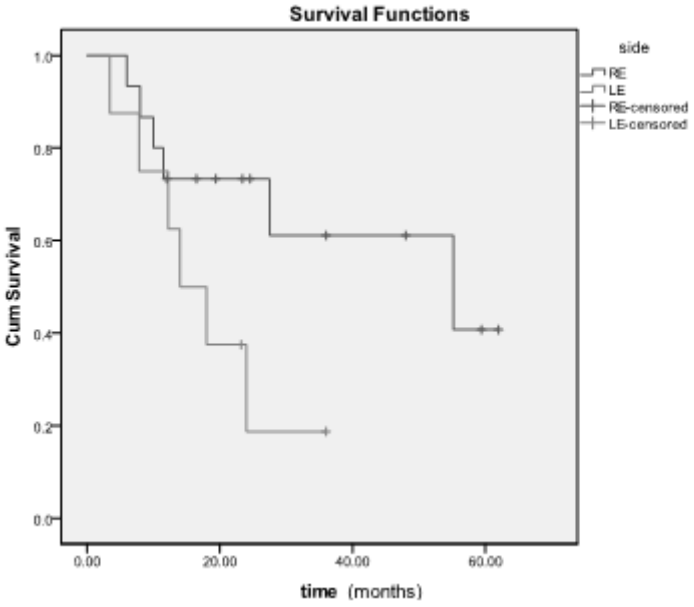

Figure 5. Survival analysis of laterality at 5-year follow-up.

Table 2. Median survival time of associated factors with Log rank test.

Factors	Median for survival time (months) (SD)	95% CI	Log rank
Gender			P = 0.22
Male	55.2 (19.4)	17.1 - 93.2	
Female	14.0 (2.6)	8.9 - 19.1	
Laterality			P = 0.08
Right	55.2 (26.2)	3.8 - 106.5	
Left	14.0 (4.1)	6.0 - 22.0	
Age-group			P = 0.07
≤ 2 years old	18.0 (8.3)	1.7 - 34.3	
>2 years old	-	-	
MRD1			P = 0.27
≤ 0 mm.	24.0 (7.6)	9.1 - 38.9	
> 0 mm.	-	-	

Discussion

Autogenous fascia lata has been the standard treatment of choice and had superior outcome in congenital myogenic blepharoptosis. [1, 7, 8] Since, autogenous fascia lata is time-consuming procedure, and could not be done in very young patients. There were literatures that illustrated using other materials instead of autogenous fascia lata to compare the outcome such as expanded polytetrafluoroethylene (ePTFE) [4, 5], Supramid [9], silicone rod [5], banked fascia lata [6], Mersilene [10], nylon [5] or other materials in ptosis correction. Most mentioned materials are not available in our practice, so the authors have been using suture material for surgical correction. In this study, we analyzed the result of using nylon suture material. Several factors that could affect the outcome of surgery including, gender, age group, laterality and preoperative MRD1 were evaluated. The recurrence rate was higher in the age group $\leq$ 2 years old compared to age-group > 2 years old (68.8% vs 31.2%) (Table 1). Accompanied with median survival graph, the age group > 2 years old did not demonstrate median survival time which reflected less than half of the patients had recurrence in the follow-up period. This finding could not be expounded why the smaller age group had more events. On the contrary, the age group (the only associated factor in this study) was not similar to the article reported by Ben Simon GJ, et al which revealed that age, gender, delta MRD, preoperative head posture, strabismus, surgery, material, and delta lagophthalmos had no influence to the recurrence. [5] Most studies only showed the outcomes comparing materials used in the operation. Regarding other factors in this study (gender, MRD1, laterality), there was no statistically significant difference in recurrence rate among them. The overall median survival time was 27.5 months. Nylon, which is monofilament and permanent suture material, could hold the sling for nearly 2.5 years. It might be temporarily favorable material in surgical correction particularly in very young children who had unavoidable indications to do the sling and could not wait for autogenous fascia lata. The recurrence rate in the present study was higher compared to other studies. [1, 3-5] This might be due to the longer follow-up period ($\geq$ 1 year). The inferiority of this study was the retrospective, descriptive design and had small sample size.

Conclusions

Suture frontalis suspension had high recurrence rate with overall median survival time at 27.5 months. However, with nearly 2.5-year-survival, it might benefit very young children who need surgical correction but in whom autogenous fascia lata suspension could not be done. The age group was the only associated factor that influenced the outcome in the study.

Acknowledgement

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