# Comparative study between local and general anesthesia in the management of sever blepharoptosis by use of straight needle threading technique as frontalis suspension

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## ABSTRACT

***Aim:*** **is to compare between the outcome and complications in the use of local and general anesthesia in the management of sever blepharoptosis by use of straight needle threading technique and silk suture as a frontalis suspension.**

***Settings and Design:*** **it's a prospective comparative study using two group one under local anesthesia and the other under general anesthesia with standardization of the cases as all has sever ptosis and poor levator functions, technique as the straight needle threading technique was used, material of thread was silk in 92% of cases, and sex distribution was of no statistical significance.**

***Methods and materials:*** **The parameters used for comparison were the following:-Satisfaction, Correction, Symmetry, Lid crease height (visible pretarsal height), Infection, stich abscess, stich granuloma, Eye opening during sleeping, Lagophthalmus, Entropion, Exposure keratitis. A 120 eye was operated on 95 patients; 25 patients (50 eyes) bilateral, 70 patients (70 eyes) unilateral, 36 eyes (30%) were operated on under local anesthesia, and 84 eyes (70%) were done under GA. The minimal age was 2years, maximum age 75 years, median 12 years, mean 19.8 years. The patients above the age of 16 years old were asked to choose between local or GA while below that age the correction was done under GA only.**

***Results:*** **There was no statistical significant difference in the all the nine parameters except the eye opening during sleeping were higher in the general anesthesia group.**

***Conclusion:*** **The use of local anesthesia is easier, of less risk, and lower cost with same aesthetic results of general anesthesia.**


***Keywords:*** **Ptosis, Blepharoptosis, frontalis sling, frontalis suspension, straight needle threading technique, silk suture.**

## دراسة مقارنة بين التخدير الموضعي والعام في علاج هطول الاجفان باستخدام تقنية خيوط الإبرة المستقيمة كتعليق عضلة الجبهة


*الهدف:* هو مقارنة بين النتائج والمضاعفات في استخدام التخدير الموضعي والعامة في معالجة هطول الاجفان من خلال استخدام تقنية إبرة مستقيمة و خيوط الحرير بواسطة التعليق على عضلات الجبهة.

*إعدادات وتصميم:* أنها دراسة مقارنة باستخدام مجموعتين واحدة تحت التخدير الموضعي والآخر تحت التخدير العام مع توحيد الحالات حيث الكل لديه تدلي الجفون شديد وسوء وظائف الرافعة القوي، كما تم استخدام تقنية خيوط الإبرة المستقيمة، من مادة الحرير في ٩٢٪ من الحالات، والاختلاف في التوزيع الجنسي بين المجموعتين غير ذا دلالة إحصائية.

*الأساليب والمواد: كانت المعلمات المستخدمة للمقارنة ما يلي:-* الرضا، التصحيح، التماثل، ارتفاع تجعد الغطاء (ارتفاع ظاهري مرئي)، العدوى، خراج الخيوط، الورم الحبيبي للخيوط، فتح العين أثناء النوم، عدم القدرة على غلق العين، التواء الجفن للداخل، التعرض التهاب القرنية. تم علاج ١٢٠ عين على ٩٥ مريضا. ٢٥ مريضا (٥٠ عيون) ثنائي، ٧٠ مريضا (٧٠ عيون) من جانب واحد، ٣٦ العينين (٣٠٪) تم معالجتها تحت التخدير الموضعي، و ٨٤ عيون (٧٠٪) تمت تحت التخدير العام. كان الحد الأدنى للسن ٢ سنة، الحد الأقصى للسن ٧٥ عاما، متوسط ١٢ عاما، يعني ١٩.٨ سنة. وطلب من المرضى الذين تزيد أعمارهم عن ١٦ سنة الاختيار بين التخدير الموضعي أو التخدير العام في حين أن أقل من هذا العمر تم التصحيح تحت التخدير العام فقط.

*النتائج :* لم يكن هناك فروق ذات دلالة إحصائية في جميع المعلمات التسعة باستثناء فتح العين أثناء النوم كان أعلى في المجموعة التخدير العام.

*الاستنتاج:* استخدام التخدير الموضعي هو أكثر أمانا، وأفضل، أقل مضاعفات وأقل تكلفة.


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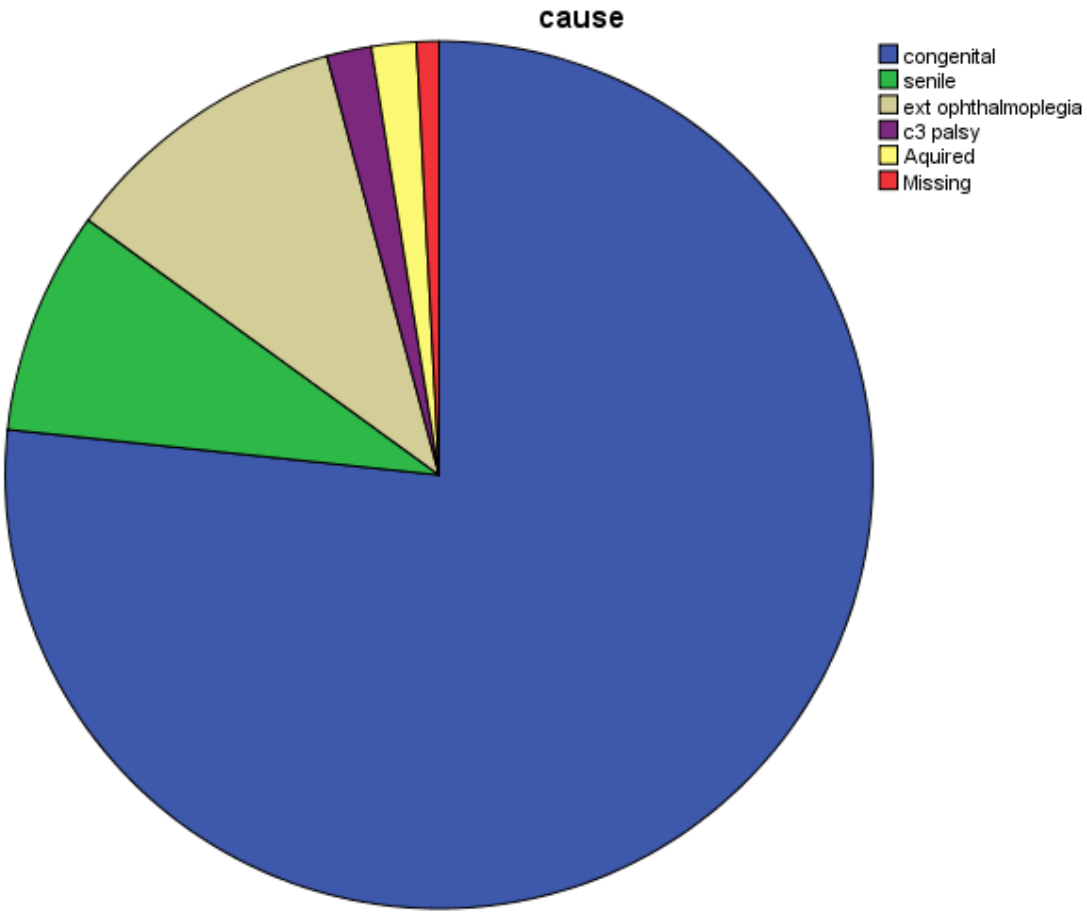
## INTRODUCTION

The type of anesthesia is one of the important question that should be answered before doing any surgery as it has dramatic effect, and is one of the important factor that affects the choice of the patient to do any surgical procedure or not. [1-3] If the procedure to be done under local anesthesia[4,5] it is less frightening to the patients because it has a low risk to them and needs less preparation as it's going to be done in the outpatient settings. Also it of low cost, which makes the patient more amenable to accept to do the procedure under local anesthesia rather than general anesthesia, Most of the patients who choose between surgeries under local or general anesthesia are more liable to accept the local anesthesia type, sometimes the patient refuses the general anesthesia because of its high risk. But the question is; does the type of Anesthesia had any effect on the outcome and the complications of sever blepharoptosis surgery? For that reason the present study was conducted to compare the difference in the results of doing frontalis sling procedure under local or general anesthesia.

## MATERIAL AND METHODS

In order to standardize the comparison between the cases selected retrospectively all of them were having sever ptosis and poor-fair levator function and they were subjected to the same surgical procedure of frontalis sling[6] with the use of straight needle threading technique. [1] The sling material used was 3/0 silk suture [7] in 92% (110 eye lids) and the other 8% (10 eye lids) was mostly 3/0 Nylon suture or silicone threads 1mm. A 120 eye lids were operated on (95 patients); 25 patients (50 eye lids) bilateral, 70 patients (70 eye lids) unilateral, 36 eye lids (30%) were operated on under local anesthesia, and 84 eye lids (70%) were done under GA. The minimal age was 2years, maximum age 75 years, median 12 years, mean 19.8 years. The patients above the age of 16 years old were asked to choose between local or GA while below that age the correction was done under GA only. The sex of the patients were males 52.5%, and females 47.5%. The cause of ptosis in this study is illustrated in (Pie chart-1 and Table-1)




**Pie chart 1. Frequencies of the cause of ptosis in this study**

**Table 1. Causes of Ptosis and it frequencies and percentage.**

| Cause | | Frequency No. | Percent % | Valid Percent | Cumulatie Percent |
|---|---|---|---|---|---|
| Valid | congenital | 92 | 76.7 | 77.3 | 77.3 |
| | senile | 10 | 8.3 | 8.4 | 85.7 |
| | External progressive ophthalmoplegia | 13 | 10.8 | 10.9 | 96.6 |
| | Cranial nerve 3 palsy | 2 | 1.7 | 1.7 | 98.3 |
| | Traumatic | 2 | 1.7 | 1.7 | 100.0 |
| | Total | 119 | 99.2 | 100.0 | |
| Missing | | 1 | .8 | | |
| Total | | 120 | 100.0 | | |

***The parameters used for comparison were the following:-***

1. *Satisfaction:-* in which baker criteria[8] was used to judge the results; satisfactory if the correction of Ptosis compared to the other normal eye in a 1mm difference. In bilateral ptosis the MRDI is 3 or 4. Unsatisfactory results are due to an over or under correction or there is Lagophthalmus during forceful closure, entropion, exposure keratitis.
2. *Correction:-* under correction, overcorrection, normal.
3. *Symmetry:-* in the shape of the palpebral fissure, this is divided into two groups, one include patients with very good or good symmetry and the other group include cases with fair or poor symmetry.
4. Lid crease height (visible pretarsal height):- 3 - 6 mm visible crease height considered good whereas the others (< 3 mm and > 6 mm) were bad
5. Infection, stich abscess, stich granuloma
6. Eye opening during sleeping
7. Lagophthalmus
8. Entropion
9. Exposure keratitis

**Surgical technique**

If the operation is done under local anesthesia, depending on the patient's age and preferences, an intravenous midazolam 1mg is used as starting dose and increased as needed to make the patient calm during the injection of local anesthesia, then supra orbital nerve block is done by Xylocaine (2%) with Epinephrine (1-80,000), then infiltration of the lines of sling Procedure done.

Then the straight needle threading technique as shown in Figures (1-3) is used. The threading is fast taking no more than 10 minutes but the important step is to balance the lid elevation to the best results. [1]

If the procedure is done under GA no local anesthetic agent was given and the procedure still carried as shown in the Figure (1-3). [1]

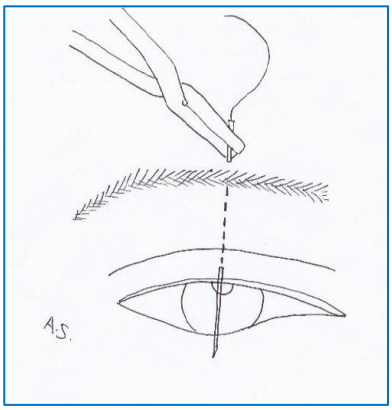


**Fig 1. Showing the introduction of the straight needle from the central incision down to the lid margin (1).**

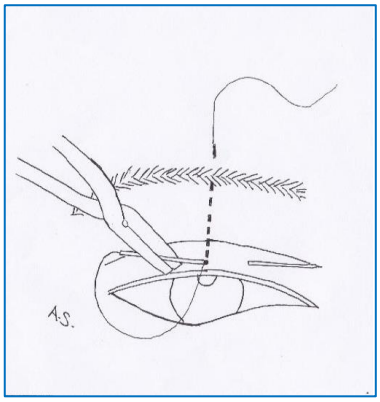


**Fig 2. Showing the second pass of the straight needle from the same exit point of the previous pass to the medial limbus side of the lid (1).**

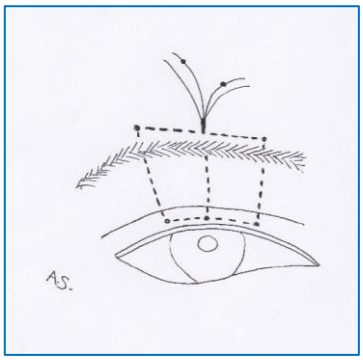


**Fig 3. Showing the completion of the two loups of silk suture in the lid and the notes exiting the central incision and the ptosis corrected (1).**

### Balancing the lid:

1. Under general anesthesia the balancing is slightly difficult as the patient is not reactive and the judgment would depends on the surgeon's experience only. Setting the level of the lid about 1mm above the upper limbus (while the eye is in the forward Gaze fixed by pence grasping the congectiva). By doing so a slight over correction is achieved. By playing with individual strand of the silk suture the medial and lateral angels can be adjusted. This over correction will be vanished over the next few weeks by the effect of edema and the silk suture cutting action on the tissue and by descends of the knots inside of the central wound.[1]
2. Under local anesthesia the balancing is not so different but as the patient is awake and cooperative while he is sitting upright with forward gaze the final lid level can be decided depending on the normal eye with a slight over correction, and by requesting the patient to look at different directions. The degree of lid lag and Lagophthalmus can be evaluated and minimized as possible. Finally the eye closure is evaluated. [1]
3. For the statistical analysis of data the statistical package for social science (SPSS) program version 20 was used.

## RESULTS

In the present study 120 eye lids were operated on, 84 eye lids under GA (70%) and 36 (30%) were under local anesthesia. Sex distribution is illustrated in (Table-2).

**Table 2. Sex distribution**

| Sex | | | Males | Females | Total |
|---|---|---|---|---|---|
| Group | under local anesthesia | Count | 17 | 19 | 36 |
| | | % within sex | 24.3% | 38.0% | 30.0% |
| | under GA | Count | 53 | 31 | 84 |
| | | % within sex | 75.7% | 62.0% | 70.0% |
| Total | | Count | 70 | 50 | 120 |
| | | % within sex | 100.0% | 100.0% | 100.0% |

The lowest age in which the procedure conducted under local anesthesia was 16 years. There is significant difference in the age distribution between the two groups, (Table-3).

**Table 3. Age distribution**

| Age groups | | | 1-12 | 13 < | Total |
|---|---|---|---|---|---|
| Group | Under local | Count | 0 | 36 | 36 |
| | | % within group age | 0.0% | 63.2% | 30.0% |
| | Under GA | Count | 63 | 21 | 84 |
| | | % within group age | 100.0% | 36.8% | 70.0% |
| Total | | Count | 63 | 57 | 120 |
| | | % within group age | 100.0% | 100.0% | 100.0% |

The cause of ptosis and its distribution between the two procedures is shown in (Table-4). There is a significant difference in the distribution of causes between the two procedures, as the congenital cases were 81.5% under GA but only 18.5% were under local anesthesia as most of those cases were under the age of 16 years, while 70% of the cases of Progressive External Ophthalmoplegia were done under local anesthesia because of the risk of delayed recovery under GA and late presentation of the disease.

**Table 4. Cross table show the cause of ptosis and its distribution between the two groups of anesthesia.**

| | | | Cause | | | | | Total |
|---|---|---|---|---|---|---|---|---|
| | | | Congenital | Senile | ext ophthal moplegia | C3 palsy | Aquired | |
| Group | Under local | Count | 17 | 7 | 9 | 2 | 1 | 36 |
| | | % within cause | 18.5% | 70.0% | 69.2% | 100.0% | 50.0% | 30.3% |
| | Under GA | Count | 75 | 3 | 4 | 0 | 1 | 83 |
| | | % within cause | 81.5% | 30.0% | 30.8% | 0.0% | 50.0% | 69.7% |
| Total | | Count | 92 | 10 | 13 | 2 | 2 | 119 |
| | | % within cause | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% |

Satisfaction, the results indicate that there is no significant difference in satisfaction between the two groups (Table-5).

**Table 5. Cross table between the two groups of anesthesia and satisfaction.**

| | | | Satisfaction | | Total |
|---|---|---|---|---|---|
| | | | Satisfactory | Unsatisfactory | |
| Group | under local | Count | 26 | 10 | 36 |
| | | % within group | 72.2% | 27.8% | 100.0% |
| | under GA | Count | 63 | 18 | 81 |
| | | % within group | 77.8% | 22.2% | 100.0% |
| Total | | Count | 89 | 28 | 117 |
| | | % within group | 76.1% | 23.9% | 100.0% |

By comparing the correction in the two groups there was a difference in form of higher correction by 16% in the GA group than the local group but this difference was statistically not significant (Table-6).

**Table 6. Cross table between the levels of correction and groups of anesthesia.**

| | | | Correction | | | Total |
|---|---|---|---|---|---|---|
| | | | Normal | Under correction | Overcorrection | |
| Group | Under local | Count | 26 | 7 | 3 | 36 |
| | | % within group | 72.2% | 19.4% | 8.3% | 100.0% |
| | Under GA | Count | 71 | 9 | 1 | 81 |
| | | % within group | 87.7% | 11.1% | 1.2% | 100.0% |
| Total | | Count | 97 | 16 | 4 | 117 |
| | | % within group | 82.9% | 13.7% | 3.4% | 100.0% |

**Chi-Square Test**

| | Value | df | Asymp. Sig. (2-sided) | Exact Sig. (2-sided) | Exact Sig. (1-sided) | Point Probability |
|---|---|---|---|---|---|---|
| **Pearson Chi-Square** | 5.655[a] | 2 | .059 | .055 | | |
| **Likelihood Ratio** | 5.233 | 2 | .073 | .084 | | |
| **Fisher's Exact Test** | 5.378 | | | .061 | | |
| **Linear-by-Linear Association** | 5.420[b] | 1 | .020 | .023 | .020 | .013 |
| **No. of Valid Cases** | 117 | | | | | |

**a. Three cells (50.0%) have expected count less than 5. The minimum expected count is 1.23.**
**b. The standardized statistic is -2.328.**

The symmetry is nearly the same in the two groups with no significant difference, (Table-7).

**Table 7. Symmetry.**

| | | | Group of symmetry | | Total |
|---|---|---|---|---|---|
| | | | very good + good | Fair + poor | |
| Group | under local | Count | 29 | 6 | 35 |
| | | % within group | 82.9% | 17.1% | 100.0% |
| | under GA | Count | 70 | 9 | 79 |
| | | % within group | 88.6% | 11.4% | 100.0% |
| Total | | Count | 99 | 15 | 114 |
| | | % within group | 86.8% | 13.2% | 100.0% |

The lid crease height (visible pretarsal height) is of no significant difference (Table-8).

**Table 8. Lid crease height.**

| Lid crease height | | | Lid crease group | | Total |
|---|---|---|---|---|---|
| | | | 3-6 good | Other bad groups | |
| Group | under local | Count | 26 | 10 | 36 |
| | | % within group | 72.2% | 27.8% | 100.0% |
| | under GA | Count | 52 | 32 | 84 |
| | | % within group | 61.9% | 38.1% | 100.0% |
| Total | | Count | 78 | 42 | 120 |
| | | % within group | 65.0% | 35.0% | 100.0% |

Complications like infection, granuloma of the central stitch and exposure of the central stitch were of no significant difference between the two groups (Table-9).

**Table 9. Cross table show infective complications distribution in the two groups.**

| Infective complications | | | complications | | | Total |
|---|---|---|---|---|---|---|
| | | | No infection | Infection / granuloma | exposure of central stitch | |
| Group | Under local | Count | 30 | 3 | 3 | 36 |
| | | % within group | 83.3% | 8.3% | 8.3% | 100.0% |
| | | % within complications | 29.1% | 37.5% | 60.0% | 31.0% |
| | under GA | Count | 73 | 5 | 2 | 80 |
| | | % within group | 91.2% | 6.2% | 2.5% | 100.0% |
| | | % within complications | 70.9% | 62.5% | 40.0% | 69.0% |
| Total | | Count | 103 | 8 | 5 | 116 |
| | | % within group | 88.8% | 6.9% | 4.3% | 100.0% |
| | | % within complications | 100.0% | 100.0% | 100.0% | 100.0% |

Regarding eye opening during sleeping which is an important sequel of the sling surgery annoying the patient and his parents, the results indicate that open eye during sleeping is to be significantly higher in the group of cases managed under GA ($P < 0.05$ and $P < 0.01$; Table-10).

**Table 10. Cross table between eye opening during sleeping groups and anaesthesia groups.**

| Eye opening during sleeping | | | Eye closure | | Total |
|---|---|---|---|---|---|
| | | | Closed eye during sleep | Open eye during sleep | |
| Group | Under local | Count | 15 | 21 | 36 |
| | | % within group | 41.7% | 58.3% | 100.0% |
| | Under GA | Count | 7 | 72 | 79 |
| | | % within group | 8.9% | 91.1% | 100.0% |
| Total | | Count | 22 | 93 | 115 |
| | | % within group | 19.1% | 80.9% | 100.0% |

Lagophthalmus was found to be of no significant difference between the two groups despite it is better in the LA group (Table-11).

**Table 11. Lagophthalmus cross table.**

| | | | Lagoophthalmus | | Total |
|---|---|---|---|---|---|
| | | | lagophthalmus | normal | |
| Group | Under local | Count | 1 | 35 | 36 |
| | | % within group | 2.8% | 97.2% | 100.0% |
| | Under GA | Count | 3 | 81 | 84 |
| | | % within group | 3.6% | 96.4% | 100.0% |
| Total | | Count | 4 | 116 | 120 |
| | | % within group | 3.3% | 96.7% | 100.0% |

**Table 12. Comparison of ptosis infection complications with published data of other sling materials.**

| Sling materials | No. of eyelids mean/median | Infection / granuloma rate % |
|---|---|---|
| **Banked fascia lata [17]** | 40 | 6 |
| **Polyfilament nylon [18]** | 121 | 12 |
| **Mersilene mesh [19]** | 20 | 18 |
| **Gore-tex [20]** | 40 | 5 |
| **polytetrafluoroethylene sheet [21]** | 79 | 7.1 |
| **Prolene [22]** | 30 | 4 |
| **Silk (current study)** | 120 | 6.9 |

The entropion and exposure keratitis were not recorded in any case of either group in the present study.

## DISCUSSION

Ptosis correction in sever Ptosis with poor levator function is a challenging case and difficult to reach Ideal situation were the patient retained his normal look and removing the stigma of the ptotic eye and return the patient to normal social life, [9, 10] this goal if reached with a simple, fast, low coast, less complications, and reversible method [11] will be of great help. So the comparison between doing the frontalis sling under local anesthesia or GA to evaluate which method is more effective and with less complications.

***To have the best possible unbiased comparison the study stabilized many variables like:***

1. All the patients were having sever ptosis and poor levator functions
2. The technique which was only frontalis sling (suspension) by the use of threads on a straight needle
3. Thread material which was 3/0 silk in 92%.
4. The sex distribution was of no significant difference ($P > 0.05$) in between the groups. But age was a significantly difference ($P < 0.05$) between the groups as it was one of the detrimental factors in the type of anesthesia for children below 16 years were done under GA. The cause of Ptosis was also significantly different ($P < 0.01$) between the groups as congenital cause occur and managed mostly[1] early in life and that will need general anesthesia beside cases of Progressive External Ophthalmoplegia which were done under local only as there is risk of delay recovery in GA and late presentation of the disease.

The comparison of the outcome was based on eight factors satisfaction, correction, and symmetry, height of the lid crease, infection complications, and eye closure during sleep, Lagophthalmus, entropion and exposure keratitis. Satisfaction depends on the absence of under or over correction and Lagophthalmus in forceful closure and exposure keratitis. The last two factors were not recorded in the present

study for any group so the correction and Lagophthalmus will determine the best results. The cross table of satisfaction show slightly higher satisfaction in the GA group 77.8% compared to 72.2% in the LA group but this difference is statistically insignificant in the literatures success rate varies like 70.97% (28 lids), [12] 74% (23 lids),[13] 75% (10 lids). [14] Results were satisfactory in 77% (69 lids), [15] up to 89% (64 lids), [8] and 91% success rate (11 children 8 years follow up), [16] that shows both technique success rate is in the good rank in comparison to other studies despite this study use more strict evaluation rules. Correction shows that the GA group has better results in form of higher normal correction and lower under and over correction in comparison to the LA group but that was statistically insignificant, and show that over correction in the LA group is easier to occur by the current technique and to be more cautious about it. Symmetry and height of the lid crease were both of no significant difference in the two groups. Infection is an important factor to be considered as there is a big difference in the settings of the operation room and the outpatient clinic in the form of sterilization and restrictions which may affect the final outcome of the results in form of more infection in the LA group, the percentage for infection/granuloma was 8.3% in LA compared to 6.8% in GA but that was of no statistical significance ($P > 0.05$), and it is near the lowest limit of infection rates as compared to other suspension materials published earlier (Table-12), so recommending to do the surgery in an operating room setting may reduce that risk. One of the sequels of sling surgery is an open eye during sleeping which is so bothering to the parents more than harming the patients eye, and this particular problem was the only statistical significant difference ($P < 0.05$ and $P < 0.01$) in this comparison showing 91.1% of GA group having the problem while only 58.3% of the LA group have it. And that may be attributed to the cooperation of the patient during lid balancing[2] and the ability to reduce the sleep opening eye problem. There was no significant difference between the use of local or general anesthesia in the management of sever ptosis by the silk frontalis sling procedure, despite it was better under local anesthesia in the sleeping open eye problem as it one of the bothering problems to the parents and patient, and by taking into consideration the risks of general anesthesia and its higher cost, the local anesthesia will be easier, better, less risky and of low cost, Finally the increased risk of infection in the local anesthesia suggesting it to be done in an operating room setting only to reduce this risk

## CONCLUSION

The local anesthesia choice of doing the frontalis sling is easier, of less risk, and lower cost with same aesthetic results of general anesthesia. Taking into consideration to reduce the risk of infection by applying the operation room settings throughout the procedure.

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