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**THE ADVANTAGES OF THE ABDOMINAL SACRAL COLPOPEXY COMBINED WITH STAPLED TRANCE-ANAL RESECTION OF THE RECTAL MUCOSAL PROLAPSE (STARR) FOR THE SURGICAL TREATMENT OF PERINEUM DESCENDING SYNDROME**

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**Abstract**

The problem of pelvic organ prolapse in women is still actual, because of high frequency of this pathology. Several surgical techniques have been suggested for pelvic descending syndrome treatment. But a large number of complications, unsatisfactory anatomical and functional results of suggested methods force to look for other solutions of the problem.

**The aim of our research** was to improve the anatomical and functional results of surgery treatment of perineum descending syndrome using abdominal sacrocolpopexy along and combined with stapled trance-anal resection of rectal mucosal prolapse (STARR).

**Materials and Methods.** For perineum descending syndrome, including rectocele, perineum body prolapsed and rectal mucosal prolapsed, 59 patients were performed abdominal sacrocolpopexy using surgical mesh and in 52 patients this technique were combined with STARR. The post-operative follow-up results were estimated in 6 months and in 2 years, using POP-Q stage determine, defecography, anorectal function testing using Polygraf ID device.

**Results.** Analyses of post operative complications associated with mesh graft were low and didn't appear their increase because of STARR additional usage. Vaginal mesh erosion was in 2 (3.4%) patients of sacrocolpopexy group and in 1 (1.9%) patient of sacrocolpopexy combined with STARR procedure group, mesh contraction in 1 (1.9%) patient of the 2<sup>nd</sup> group, vaginal shrinkage in 1 (1.7%) patient of the 1<sup>st</sup> group, dyspareunia de novo in 3 (5.1%) and 2 (3.8%) patients accordingly ( $p > 0.05$ ). Using POP-Q system rectocele diagnostic stage 0 was achieved in 22(38.9%) of patients underwent sacrocolpopexy along and in 25(48.1%) of patients underwent sacrocolpopexy together with STARR. The other patients of both groups had stage I. Defecography founded out the

raise of perineum body in all patients without significant difference, but the figure values were closer to normal ones in complex surgery treatment group: in the rest  $-3.7\pm 0.5$ cm and  $-3.5\pm 0.6$  cm, in the straining  $-5.9\pm 0.6$  cm and  $-6.2\pm 0.7$  cm in the 1<sup>st</sup> and 2<sup>nd</sup> groups accordingly. The anatomical correction of posterior ano-rectal angle diagnosed rentgenologically was achieved in both groups but didn't depend on surgery methods performed in this study. Rentgenological disappearance of rectal mucosal prolapse has been achieved in 15 (25.4%) patients of the 1<sup>st</sup> group and in 47(90.4%) patients of the 2<sup>nd</sup> group. So voiding improvement was better in the 2<sup>nd</sup> group patients. Voiding normalization noted 12(20.3%) and 15(28.8%) patients, voiding improvement 28(47.4%) and 30(57.7%) and constipation remained in 19(32.2%) and in 7(13.4%) patients of the 1<sup>st</sup> and 2<sup>nd</sup> groups accordingly ( $p<0.05$ ). Anorectal manometry and pudendal nerve terminal motor latency test showed the gradual improvement of the continence after pelvic floor level and configuration reconstruction in both groups without significant difference.

**Conclusions.** Abdominal sacrocolpopexy can be choiced for surgical treatment descending perineum syndrome, as it has satisfactory anatomy and functional results, including incontinence treatment and low complications rate. But in plural character of posterior compartment prolapse, including rectal mucosal prolapse, which is not improved by sacrocolpopexy along, the combined surgery is possible and preferable. Simultaneous STARR procedure showed better results for constipation improvement and didn't elevate the complications' rate.

**Keywords:** Pelvic organ prolapse, perineum descending syndrome, rectal mucosal prolapsed, sacrocolpopexy, stapled transe-anal resection, constipation, incontinence

## **Introduction**

Pelvic prolapse is a syndrome of pelvic floor and pelvic organ descending. For the first time it was discovered by Parks as long ago as in 1966 [1]. But today pelvic floor pathology is still far from its solution.

According to our own and literature data 50-60% of perimenopausal women approximately suffer from different manifestations of pelvic organ prolapse, more than in half of them this pathology is combined (Pelvic floor defects may occur in anterior, posterior or medial segment or combination of all) and 1 of 10 is needed surgical correction [2, 3].

In recent years with the introduction of such methods of investigation as proctography with intension and/or defecography, it was found out, that rectocele is often accompanied with perineum body descending and rectal mucosal prolapse densely in anterior, rarely – in posterior semi-circle or the whole circle of the rectum, which

intensifies the symptoms of the disease [4]. This pathology is not removed by the traditional surgical correction of rectocele [5, 6].

Sacrocolpopexy consider being one of the most effective surgical procedures to correct pelvic organ prolapse and widely use in gynecology practice especially to repair postgysterectomy prolapsed [7]. But anatomical and functional results of sacrocolpopexy usage for surgical treatment of rectocele combined with perineum descending syndrome have not been investigated enough.

**The aim of our research** was to improve the anatomical and functional postoperative results in patients with combined posterior prolapsed (perineum descending syndrome), to compare the effectiveness of sacrocolpopexy along and combined with stapled transanal resection of rectal mucosal prolapse (STARR) using circular stapler (PPH kit) and to evaluate its feasibility, intraoperative complications, short-term and follow-up results.

## **MATERIALS AND METHODS**

All procedures were performed at the Department of Surgery and Coloproctology of Belgorod State National Research University and Regional Clinical Hospital, Belgorod, Russia, from 2011 to 2014, and were approved by Local Ethics Committee.

For prolapse diagnostics the following procedures have been performed: dedicated questionnaire, digital rectal and vaginal examination (the evaluation of a prolapse was conducted using the Quantification System of Pelvic Organ Prolapse (POP-Q)), RRS (with straining according to Parks), defecography (for the rectocele degree diagnostic, perineum body descending and rectal mucosal intussusceptions), ultrasound and magnetic resonance imaging (performed to diagnose mm. levator ani and recto-vaginal aponeurosis (Denonvilliers' fascia) damage), anorectal function testing (Polygraf ID device). Using these diagnostic methods in 1000 women with rectocele the combined pathology of posterior segment, such as perineum body descendance, was revealed in 62% of the patients with rectocele. 52% of patients with rectocele combined with perineum descendance had I-II stage of anal incontinence and 87% had rectal mucosal intussusceptions.

111 patients with all combined pathology such as rectocele, perineum body descendance, rectal mucosal prolapse and anal sphincter deficiency were included in this investigation and were divided into 2 groups without randomization. 59 patients were performed transe-abdominal sacrocolpopexy and 52 patients were performed sacrocolpopexy combined with STARR procedure.

Sacrocolpopexy was performed by abdominal approach. The pelvic peritoneum was opened from the sacrum promontory toward the cul-de-sac and separated aside. The vaginal walls were mobilized up to perineum. Sacrocolpopexy was performed using polypropylene surgical mesh. The strip of surgical mesh was placed between rectum anterior wall and vagina posterior wall and sutured to each of them; distal mesh part was placed into rectovaginal septum up anal sphincter to repair rectocele and perineum. The proximal part of mesh strip was fixed to sacral promontory. After fixation, the pelvic peritoneum over the mesh was closed in order to prevent its exposition into the abdominal cavity.

STARR procedure was performed using disposable set PPH 002, developed by «Ethicon Endosurgery», the main part of which is circular stapler, according to the method, suggested by Italian surgeon A.Longo [5].

The results of surgery techniques had been estimated, using the following criteria: the painful syndrome intensity, the frequency of purulent complications, the frequency of erosions and granulomas, the dyspareunia appearance in distant follow-up period, the rectocele and perineum descending anatomical correction (due to POP-Q System and defecography data), voiding and continence improvement, the relapse frequency.

The post-operative results were estimated in 6 months and follow-up over 2 years.

All data were compared using Student's criteria, Fisher's exact test, for non-parametric variables Mann-Whitney test was used and Wilcoxon paired test for POP-Q parameters estimation was used. The significance level was 5%.

All women had intact uteri, had no other kinds of surgery for prolapse, all were white race and the same according to the other demography criteria and prolapse degree, which stage III-IV was according POP-Q. Patient demographics and prolapse stage are included in Table 1.

**Table 1.** Patient demography and Pelvic Organ Prolapse stage.

| Parameter                            | Surgery                |                              |
|--------------------------------------|------------------------|------------------------------|
|                                      | Sacrocolpopexy<br>N=59 | Sacrocolpopexy+STARR<br>N=52 |
| Mean age                             | 58.9±8.9               | 59.6±9.1                     |
| Body Mass Index (kg/m <sup>2</sup> ) | 27.1±3.8               | 26.6±4.2                     |
| Mean parity                          | 2.1±0.8                | 2.3±0.7                      |
| Menopausal                           | 42 (71.2%)             | 38 (73.1%)                   |
| Estrogen therapy                     | 15 (35.7%)             | 13 (34.2%)                   |

P > 0.05

|  |            |            |              |
|--|------------|------------|--------------|
| Smoker                                   | 21 (35.6%) | 18 (34.6%) | for all data |
| Co morbidity                             | 39 (66.1%) | 35 (67.3%) |              |
| Posterior segment prolapse stage (POP-Q) |            |            |              |
| III                                      | 40 (67.8%) | 35 (67.3%) |              |
| IV                                       | 19 (32.2%) | 17 (32.4%) |              |

## Results

No significant intra operational complications were observed for any patients of both groups. There were no intra operative injuries of the sacral blood vessels, ureters, or rectum wall. Average blood loss was  $235 \pm 21.4$  ml in the sacrocolpopexy group and  $246 \pm 25.6$  ml in sacrocolpopexy and STARR group ( $p > 0.05$ ). Median operative time was  $85 \pm 10.6$  min for sacrocolpopexy without any difference in both groups and  $22 \pm 4.6$  min for STARR procedure. Simultaneous STARR procedure didn't influence greatly on postoperative pain syndrome, as most patients experienced rectal discomfort only for the 1st post operative day. There were no significant inflammatory complications in the both groups. There was one suppuration in the abdominal wall wound in the complex surgery group which was treated successfully by drainage and local antibacterial medicine. There were no inflammatory complications in the rectum, when circular stapler had been used.

Analyses of post operative complications associated with mesh were low and didn't appear their increase because of STARR additional usage (Table 2). All these complications were treated conservatively as it was no necessity in mesh removal. The dyspareunia appearance in distant follow-up postoperative period had been noted in one patient because of excessive vaginal narrowing and in two patients with erosion appearance; in other two patients its appearance was inexplicable.

**Table 2.** Late complications associated with surgical mesh.

| Parameter            | Surgery                |                              |
|----------------------|------------------------|------------------------------|
|                      | Sacrocolpopexy<br>N=59 | Sacrocolpopexy+STARR<br>N=52 |
| Vaginal mesh erosion | 2 (3.4%)               | 1 (1.9%)                     |
| Vaginal granulomas   | 1 (1.7%)               | 0                            |

|                     |          |          |              |
|---------------------|----------|----------|--------------|
| Mesh contraction    | 0        | 1 (1.9%) | P > 0.05     |
| Vaginal shrinkage   | 1 (1.7%) | 0        | for all data |
| Dispareunia de novo | 3 (5.1%) | 2 (3.8%) |              |

Anatomical correction of prolapsed was achieved in all patients of both groups, but results assessment revealed that they were better in the group underwent complex surgery treatment. Using POP-Q system rectocele diagnostic stage 0 was achieved in 22(38.9%) of patients underwent sacrocolpopexy along and in 25(48.1%) (p<0.05) of patients underwent sacrocolpopexy together with STARR. The other patients of both groups had stage I. In 2 year follow-up period there was no relapse incidence, but in 8 patients of the 1<sup>st</sup> group and in 4 patient of the 2<sup>nd</sup> group stage 0 turned into stage I. Defecography founded out the raise of perineum body in all patients, but the figure values were closer to normal ones in complex surgery treatment group. Rentgenological disappearance of mucosal prolapse has been achieved in 15(25.4%) patients of the 1<sup>st</sup> group and in 47(90.4%) (p<0.05) patients of the 2<sup>nd</sup> group. In the 2 year follow-up the results were less bad: 11(18.6%) и 44(84.6%) accordingly. The anatomical correction of posterior ano-rectal angle diagnosed rentgenologically was achieved in both groups but didn't depend on surgery methods performed in this study (Table 3).

**Table 3.** Prolapse anatomical correction.

| Parameter  | Surgery        |            |                      |                | p         |           |
|--|----------------|------------|----------------------|----------------|-----------|-----------|
|  | Sacrocolpopexy |            | Sacrocolpopexy+STARR |                |           |           |
|  | N=59           |            | N=52                 |                |           |           |
|  | In 6 month     | In 2 year  | In 6 month           | In 2 year      |           |           |
| Rectocele anatomical correction (according to POP-Q) |                |            |                      |                |           |           |
| Stage 0  | 22 (38.9%)     | 14 (23.7%) | 25 (48.1%)           | 21 (40.4%)     | p < 0.05  |           |
| Stage I  | 37 (61.1%)     | 45 (76.3%) | 27 (51.9%)           | 31 (59.6%)     | p* < 0.05 |           |
| Disappearance of mucosal prolapse                    | 15(24.4%)      | 11(18.6%)  | 47(90.4%)            | 44(84.6%)      |           |           |
| Perineum level (cm)                                  |                |            |                      | Before surgery | p > 0.05  |           |
| Rest   | -3.7±0.5       | -3.8±0.7   | -3.5±0.6             | -3.7±0.5       | -4.7±0.6  | p* > 0.05 |
| Straining  | -5.9±0.6       | -6.1±0.6   | -6.2±0.7             | -6.4±0.5       | -9.2±0.8  | p**<0.05  |
| Anorectal posterior angle (degrees)                  |                |            |                      |                |           | p > 0.05  |

|           |           |           |           |           |           |           |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Rest      | 109.5±6.5 | 111.7±7.1 | 107.7±7.3 | 113.2±6.9 | 136.7±5.9 | p* > 0.05 |
| Straining | 148.8±8.1 | 151.3±6.4 | 147.3±5.9 | 148.4±4.3 | 171.1±8.5 | p**<0.05  |

p – differences between the groups in 6 month and in 2 year follow-up periods

p\* - differences in 6 month and 2 year follow-up within one group

p\*\* - differences between preoperative and postoperative data

In the normal’s ano-rectal border locates above 3 cm from pubo-coccygeous line in the rest, and in straining effort falls down less than 3 cm.

In the normal’s ano-rectal angle value amounts 99.9±1.5° in average in the rest and 135.5±2.2° in straining effort.

The patients themselves had estimated the postoperative results as: good (voiding normalization), satisfactory (voiding improvement) and not satisfactory (not changing constipation). The patients’ subjective sensations of voiding improved had been confirmed by impartial data of ano-rectal manometry. Estimation criteria were better in the group with STARR procedure usage without significant differences. The same data have been shown by balloon test (Table 4).

**Table 4.** Defecation Function’ Estimation.

| Parameter | Surgery                   |           |                                 |           |
|-----------|---------------------------|-----------|---------------------------------|-----------|
|           | Sacrococcolpopexy<br>N=59 |           | Sacrococcolpopexy+STARR<br>N=52 |           |
|           | In 6 month                | In 2 year | In 6 month                      | In 2 year |

The patients’ subjective sensations of voiding improvement (number of patients)

|                       |           |           |           |           |          |
|-----------------------|-----------|-----------|-----------|-----------|----------|
| Voiding normalization | 12(20.3%) | 10(16.9%) | 15(28.8%) | 13(25%)   |          |
| Voiding Improvement   | 28(47.4%) | 27(45.8%) | 30(57.7%) | 31(59.6%) | p < 0.05 |
| Constipation          | 19(32.2%) | 22(37.3%) | 7(13.4%)  | 8(15.4%)  | p*> 0.05 |

Anorectal manometry: rectal sensation thresholds

|   | Before Surgery |          |          |          |          |          |
|---|----------------|----------|----------|----------|----------|----------|
| First sensation (ml)<br>(normal 24.3±1.4) | 28.3±1.6       | 27.4±2.3 | 25.6±3.5 | 26.6±2.2 | 32.4±1.8 |          |
| Maximum tolerable                         | 76.9±2.3       | 78.9±3.1 | 73.9±3.2 | 75.8±2.7 | 84.2±2.9 | p > 0.05 |

|                   |         |         |         |         |         |            |
|-------------------|---------|---------|---------|---------|---------|------------|
| Volume (ml)       |         |         |         |         |         | p* > 0.05  |
| (normal 72.3±3.1) |         |         |         |         |         | p** < 0.05 |
| Rectal Compliance | 6.9±1.2 | 7.3±0.9 | 5.3±0.9 | 5.6±1.7 | 8.2±1.0 |            |
| (ml/mmHg)         |         |         |         |         |         |            |
| (normal 4.7±0.9)  |         |         |         |         |         |            |

Expulsion (balloon) Test

|   |           |           |           |           |
|---|-----------|-----------|-----------|-----------|
| Patients' number                        | 38(64.4%) | 36(61.3%) | 37(71.1%) | 35(67.3%) |
| had been able to expel a 150 ml-balloon |           |           |           |           |

p – differences between the groups in 6 month and in 2 year follow-up periods

p\* - differences in 6 month and 2 year follow-up within one group

p\*\* - differences between preoperative and postoperative data

Anorectal manometry and pudendal nerve terminal motor latency test showed the gradual improvement of the continence after pelvic floor level and configuration reconstruction. It can be explained by pudendal nerve traction stopping. The further biofeedback therapy and pudandal nerve electro stimulation improved the continence (Table 5).

**Table 5.** The Descending Perineum Syndrome Incontinent Correction Analysis

| Parameter   | Surgery           |                  |                      |                  | Preoperatively |                         |
|---|-------------------|------------------|----------------------|------------------|----------------|-------------------------|
|   | Sacrococpopexy    |                  | Sacrococpopexy+STARR |                  |                |                         |
|   | N=59              | N=52             | N=59                 | N=52             |                |                         |
|   | 6 month follow-up | 2 year follow-up | 6 month follow-up    | 2 year follow-up |                |                         |
| Pressure in the internal anal sphincter region (mmHg) | 31.1±2.9          | 35.5±3.7         | 31.9±3.1             | 35.9±3.9         | 27.6±3.4       |                         |
|   |                   |                  |                      |                  |                | p > 0.05                |
| Pressure in the external anal sphincter region (mmHg) | 45.9±3.7          | 48.8±4.2         | 45.6±4.1             | 49.1±4.8         | 40.2±4.3       | p* > 0.05<br>p** < 0.05 |
| Pudendal nerve terminal motor latency test (msec)     | 2.43±0.19         | 2.15±0.13        | 2.41±0.16            | 2.19±0.17        | 2.97±0.29      |                         |

p – differences between the groups in 6 month and in 2 year follow-up periods

p\* - differences in 6 month and 2 year follow-up within one group



p\*\* - differences between preoperative and postoperative data

Determined in normal: pressure in the IAS region was  $39.4 \pm 2.7$  mmHg; in the EAS region –  $53.3 \pm 3.7$  mmHg;

Pudendal nerve terminal motor latency test –  $1.95 \pm 0.21$  msec.

## **Discussion**

Pelvic prolapse is a common problem affecting women of all ages. As life expectancy increases, the prevalence of pelvic organ prolapse in general, and rectoceles, in particular, will continue to grow. The main themes in the current literature stress the importance of not only anatomic restoration, but also quality of life issues. While anatomic and overall functional outcomes have improved, one still needs to better define the correlation between defecatory dysfunction and rectocele [8]. Voiding difficulties are often associated with prolapse [2]. Rectocele, or namely the protrusion of the anterior wall of the rectum into the vaginal lumen following the collapse of the rectovaginal septum, is the most common anatomic alteration observed in patients suffering from defecation disorders. The pathogenesis of rectocele is still controversial [9]. Levatoroplasty consider being effective to surgical treatment of rectocele [10]. But it is not effective for rectocele combined with perineum body and rectal mucosal prolapse. Pelvic descending syndrome remains a disorder for which the best method of treatment is debated because of not satisfactory anatomical and functional results [11]. Different opinions exist about optimal method choice for perineum level and rectal mucosal prolapse correction. It seemed that with appearance in 2004 Gynecare Prolift System (Jonson&Jonson) for reconstruction of pelvic floor, the problem of pelvic organ prolapse had been solved. The studies have shown that 2-cm wide straps are optimally forces tissue and correct rectocele and perineum body level. But the great number of postoperative complications such as vaginal mesh erosions, granulomas, vaginal shrinkage, and caused pelvic discomfort forced the majority of surgeons to revise their attitude to this surgical technique and resumed to traditional surgery of pelvic organ prolapse without grafts using vaginal approach [12, 13]. Our own and other authors' experience shows that surgery is rarely performed for isolated rectal internal prolapse [14]. Combined transvaginal and transanal rectocele repair is beneficial for the majority of patients with obstructed defecation [15]. But careful preoperative patient selection is vital to improve outcomes. Preoperative counseling of all patients undergoing rectocele repair is of extreme importance, in particular explaining the evolving nature of pelvic floor dysfunction and the possible need for further reconstructive surgery [16]. Different techniques and approaches are used for reconstruct rectocele, combined with rectal mucosal prolapse. Rectocele is usually repaired by levatoroplasty by transvaginal, transperineal and transanal approaches. All these methods have their own advantages and defects [17].

The characteristics of anal anatomy and physiology make the smooth healing of wounds difficult and tend to cause postoperative pain, bleeding, infection, prolonged healing time, etc. To prevent such difficulties, careful surgery must be well planned. Combined perineal and endorectal stapler repair of rectocele may be a useful new surgical tool for correcting distention rectocele associated with mucosal prolapse and perineum descent in selected patients [6, 18].

Rectal internal prolapse remains a disorder for which the cause is not clearly understood and the best method of management is debated. Our own experience and other's authors data confirm that mucosal resection using circular stapler is effective in reducing postoperative pain and leads to rapid return to normal activities compared with its traditional mobilization and bringing down to the anal canal. As with any innovative surgical technique, however, concerns will inevitably be raised about issues of safety and efficacy. The most of surgeons rated the efficacy of the procedure as excellent in 75%, good in 19.8%, average in 4.7%, and poor in 0.6% [6, 14, 19] .

In spite of rectal mucosectomy became a widely accepted surgical procedure, a severe bleeding may occur in rare cases. Some surgeons notice intraoperative bleeding in 58% of patients, who required additional sutures to achieve perfect hemostasis [20, 21]. As the other authors, we consider, that stapled resection according to Longo for treating mucosal prolapse appears to be simple technically. Nevertheless, we would also agree with Brisinda's comments that the stapling procedure requires advanced surgical skills and should be carried out only by operators with sufficient technical experience [22]. Our and other's authors data suggest that mucosal prolapse resection using circular stapler may be a useful for surgical treatment of rectocele. Stapler's usage doesn't increase significantly operative trauma and postoperative pain syndrome [5, 14]. But our experience showed that postoperative poor functional outcomes in patients underwent combined levatoroplasty and STARR procedure could be explained: these techniques don't effective enough for perineal body lifting. According to literature data, abdominal sacrocolpopexy is one of the most effective and safe surgeries performed for pelvic organ prolapse repair, especially for post-hysterectomy prolapsed. Different modifications of this operation are performed today, including surgical meshes which are fixed to promontory proximally and between vaginal posterior surface and rectal anterior surface in the mm. levators level [23, 24, 25]. Postoperative defecography in patients underwent sacrocolpopexy for post-hysterectomy prolapsed in our hospital revealed as well the perineum body raise. That's why we decided to estimate anatomical and functional results of abdominal sacrocolpopexy, using surgical mesh fixed to anterior surface of the rectum and posterior surface of the vagina in their lower part between mm. levator ani for surgical treatment of perineum descending syndrome along and combined with STARR procedure.

## Conclusions

Thus our investigation showed that the intra abdominal sacrocolpopexy can be choice for surgical treatment of descending perineum syndrome, as it has satisfactory anatomy and functional results, including voiding and incontinence treatment and low complications rate. But in plural character of posterior compartment prolapse, including rectal mucosal prolapse, which is not improved by sacrocolpopexy along, the combined surgery is possible and preferable. Simultaneous Stapler trans-anal resection of the rectum mucosa prolapse using circular stapler showed better results for constipation improvement and didn't elevate the complications' rate.

But the small number of relevant cases severely limits the assessment of this combined surgery method. We completely understand that larger number of cases is needed to prove our point of view.

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