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ORIGINAL ARTICLE GENITAL SURGERY

Reduction of Hypertrophic Labia Minora by Posterior-Lateral Wedge Resection with Preservation of the Central Blood Vessels and Nerve Bundle

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Abstract

Objective The aim of this study was to introduce a new method of labiaplasty. Here, we describe the surgical procedure, outcomes and the advantages of this method.

Method The medical records of 21 patients aged between 20 and 45 years who underwent reduction of the labia minora from February 2015 to June 2017 were reviewed. The procedures performed in these studies used posterior-lateral wedge resection with preservation of the central blood vessels and nerve bundle.

Results All the surgeries were performed successfully, and 21 patients experienced an uneventful postoperative period. A minor dehiscence occurred in one patient, who recovered with no requirement for additional treatment. All of the patients were satisfied with the eventual esthetic appearance.

Conclusion The posterior-lateral wedge resection with preservation of the central blood vessels and nerve bundle is a simple and safe method that is associated with satisfactory outcomes.

Level of Evidence IV This journal requires that authors assign a level of evidence to each article. For a full description of these Evidence-Based Medicine ratings, please refer to the Table of Contents or the online Instructions to Authors www.springer.com/00266.

Keywords Labia minora reduction · Hypertrophied labia minora · Modified labiaplasty

Introduction

Labia minora hypertrophy is a common female vulvar deformity that can be congenital or acquired [1]. Hypertrophy of the labia minora is associated with uncomfortable sexual intercourse and genital irritation during walking or running, and surgical excision of the hypertrophic tissue is the only treatment. Currently, labiaplasty is becoming increasingly popular for the improvement of sexual intercourse and genital esthetics, but simple excision of the hypertrophic labia minora is unable to meet the needs of patients [2]. The key to labiaplasty is not only to remove the hypertrophic tissue of the labia minora but also to reconstruct the normal shape and preserve the original skin sensitivity [3].

Patients and Methods

Patients

From February 2015 to June 2017, 21 patients with labia minora hypertrophy were treated with the procedure described in this paper. The ages of these patients ranged from 20 to 45 years (mean age: 29 years). Twelve patients were diagnosed with bilateral labia minora hypertrophy, including 10 congenital and 2 acquired cases. Nine patients were diagnosed with unilateral labia minora hypertrophy; all of these cases were congenital. Seven patients sought the procedure to relieve symptoms of local discomfort that

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affected their daily activities, and 14 patients underwent the procedure for esthetic reasons (Table 1).

Methods

In patients with bilateral hypertrophy, the incisions were designed according to the requests of the patients and the intraoperative findings, and the procedure focused on restoring the normal size and shape of the labia minora. For patients with unilateral labia minora hypertrophy, the incisions were designed according to the shape and size of the contralateral normal labia minora. An example of a surgical design in a case of unilateral hypertrophic labia minora is shown in Fig. 1. The anterior and posterior junctions of the hypertrophic labial minora are marked as A and B, respectively, while the anterior and posterior junctions of the contralateral labia minora are marked as a and b. Point d is the midpoint of the edge of the normal labial minora. Point e is the midpoint of line a–b. Point C is marked on the free edge of the hypertrophic labia minora, and lines A–C and a–d–b are of equal length. Point D is the midpoint of line A–C, and a perpendicular line is made through point D to point E; the distance from point D to point E is equal to that of point d to point e. An arc from point C to point E is extended to point F on line A–B. After adjusting the position of point F and the curvature of line C–E–F, the length of line C–E–F is equal to that of line F–B.

The procedure for the reduction of bilateral labia minora hypertrophy is described as an example. The procedure was performed within 3–7 days after menstruation. The patient was placed in the lithotomy position. The vulva and vaginal introitus were disinfected with iodophor, and the operative field was draped. Infiltration anesthesia (0.5% lidocaine plus 1:200,000 epinephrine) was administered subcutaneously in the area within the F–B and C–E–F marker lines in the medial labia minora. The skin and submucosal layer were incised along the marker line. Sharp separation with ophthalmic scissors was performed via the loose space of the submucosal tissue until points B and C were reached on the free edge of the labia minora. The stripped tissue from the medial labia minora was removed (Fig. 2). After electrocoagulation of the wound was completed, a 4-0 VICRYL Rapide suture was used for suturing points B and C and the incision intermittently to complete the reduction of the medial hypertrophic labia minora (Fig. 3). After closure of the medial labia minora incision, a section of the lateral hypertrophic tissue of the labia minora was gathered and naturally deposited on the upper

Table 1 Characteristics of patients

Patient	Age (year)	Side of resection	Symptoms of local discomfort	Uncomfortable sexual intercourse	Esthetic concerns
1	26	Both	No	No	Yes
2	24	Left	No	No	Yes
3	30	Right	No	No	Yes
4	20	Right	No	No	Yes
5	24	Left	No	No	Yes
6	38	Both	Yes	Yes	No
7	21	Both	Yes	No	No
8	36	Left	No	No	Yes
9	32	Both	No	Yes	No
10	30	Right	No	No	Yes
11	33	Both	No	No	Yes
12	28	Both	Yes	Yes	No
13	28	Right	No	No	Yes
14	23	Both	No	No	Yes
15	31	Right	No	Yes	No
16	34	Both	No	No	Yes
17	24	Both	Yes	No	No
18	35	Left	No	No	Yes
19	45	Both	Yes	Yes	No
20	24	Both	No	No	Yes
21	28	Both	No	No	Yes

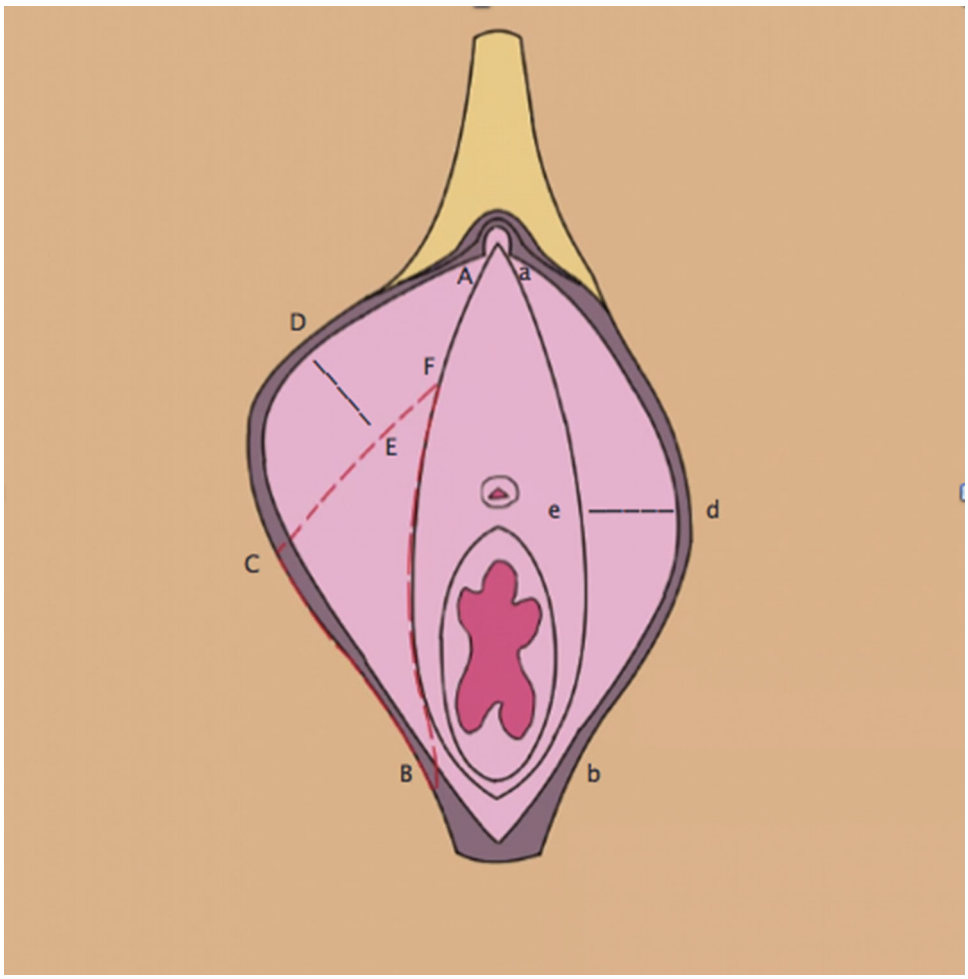

Fig. 1 The anterior and posterior junctions of the hypertrophic labial minora are marked as A and B, while the anterior and posterior junctions of the contralateral labia minora are marked as a and b. Point d is the midpoint of the edge of the normal labial minora. Point e is the midpoint of line a–b. Point C was marked on the free edge of the hypertrophic labia minora, and lines A–C and a–d–b are of equal length. Point D is the midpoint of line A–C, and a perpendicular line was made through point D to point E; the distance from point D to point E is equal to that from point d to point e. An arc from point C to point E was extended to point F on line A–B. After adjusting the position of point F and the curvature of line C–E–F, the length of line C–E–F was equal to that of line F–B

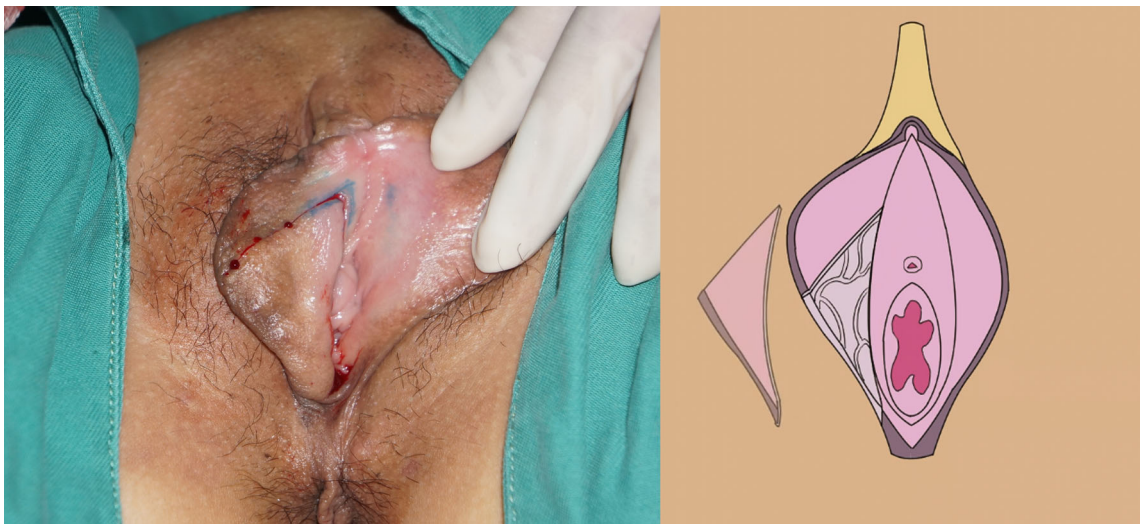

Fig. 2 The skin and submucosal layer were incised along the marker line F–B and the marker line C–E–F in the medial labia minora. Sharp separation was performed via the loose space of the submucosal tissue until reaching points B and C on the free edge of the labia minora. The stripped tissue of the medial labia minora was removed

edge of the labial minora sulcus. A fusiform incision was made in the labial minora sulcus and the upper edge of the labia minora tissue section; this was marked with methylene blue solution. Infiltration anesthesia (0.5% lidocaine

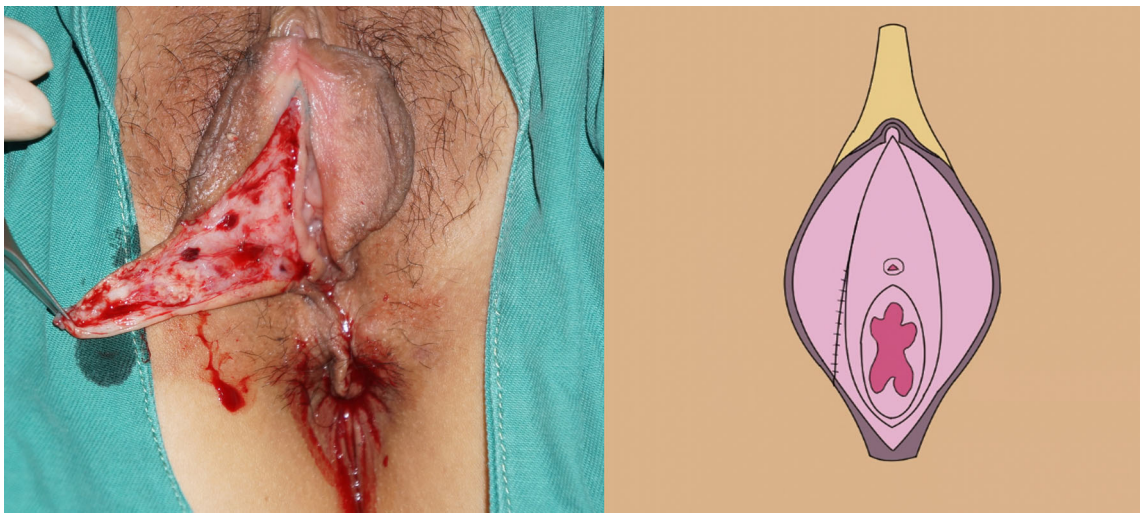

Fig. 3 The suture was used for suturing point B and C and the incision intermittently to complete the reduction of the medial hypertrophic labia minora

plus: 1:200,000 epinephrine) was administered subcutaneously in the area within the marker line. The skin was incised, and sharp separation with ophthalmic scissors was performed via the loose space of the submucosal tissue to remove the gathered skin tissue (Fig. 4). After electrocoagulation of the wound was completed, a 4-0 VICRYL Rapide suture was used to close the incision in the lateral labia minora to complete the reduction of the lateral hypertrophic labia minora (Fig. 5). The same method was used to complete the reduction of the contralateral hypertrophic labia minora. An indwelling urinary catheter was not required after surgery. Antibiotic ointment and sterile gauze were applied to the suture lines. On the second day after surgery, the dressing was removed, and the vulva was cleaned with brompheniramine disinfectant. Patients could begin showering normally 7 days after surgery. The VICRYL Rapide sutures did not need to be removed and came off later spontaneously. Patients could resume normal sexual intercourse 3 weeks after surgery.

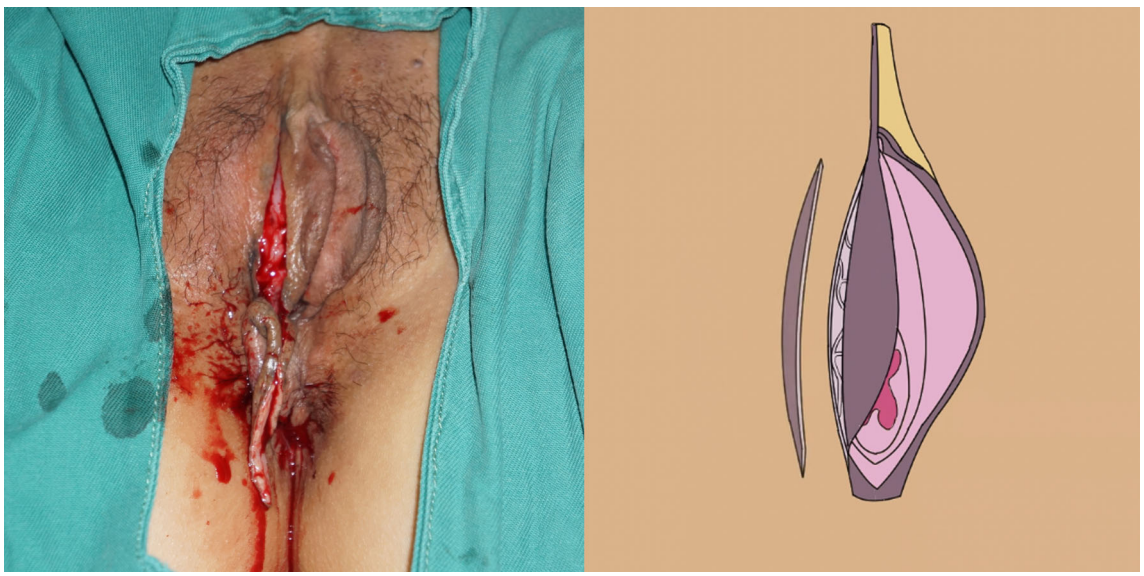

Fig. 4 After closure of the medial labia minora incision, a section of the lateral hypertrophic tissue of the labia minora was gathered and naturally deposited on the upper edge of the labial minora sulcus. A fusiform incision was designed in the labial minora sulcus and the upper edge of the labia minora tissue section. The skin was incised, and sharp separation was performed via the loose space of the submucosal tissue to remove the gathered skin tissue

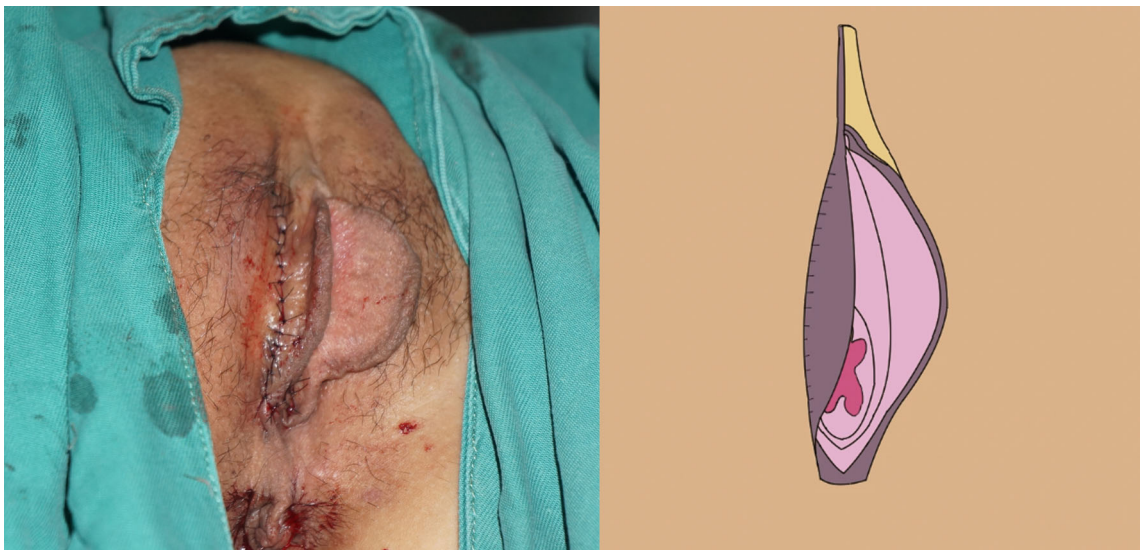

Fig. 5 The suture was used for closure of the incision in the lateral labia minora to complete the reduction of the lateral hypertrophic labia minora

Fig. 6 Photographs of one 30-year-old woman who underwent bilateral labia reduction: (above) preoperative view of hypertrophied labia minora; (below) postoperative view at 12 months with an excellent cosmetic appearance. The surgical suture lines were concealed, and there were no noticeable scars

Fig. 7 Photographs of one 24-year-old woman who underwent unilateral labia reduction: (above) preoperative view; and (below) postoperative view at 6 months. There were no noticeable scars, and shapes of the labia minora were natural

Results

All of the surgical procedures were performed in the outpatient operating room. The operative time was between 30 and 50 min. The incisions all healed normally. The preserved labia minora had good blood supplies, and no ischemic necrosis of the free edges was reported. One patient had a small V-shaped dehiscence of the incision at the free edge of the labia minora 3 days after surgery that healed without any further treatment. All of the patients were satisfied with their results after a 6- to 14-month follow-up period. The shapes of the labia minora were natural, and the sensitivity of the skin was unchanged. The surgical suture lines were concealed, and there were no noticeable scars (Figs. 6, 7). The preoperative symptoms, including discomfort during sexual intercourse and genital irritation during walking and running, subsided (Table 2).

Discussion

Hypertrophy of the labia minora is a common female vulvar deformity, and surgical treatment can be considered if the condition causes genital discomfort during walking, affects the direction of urine flow or interferes with sexual intercourse [2]. Currently, the use of labiaplasty to improve the quality of sexual intercourse and the esthetics of the genital appearance is gradually increasing. The key to labiaplasty is not only to remove the hypertrophic tissue of the labia minora but also to reconstruct the normal shape, especially the natural shape of the free edge and to preserve the original skin sensitivity [3]. The three major types of labiaplasty for labia minora hypertrophy include edge resection and suturing, de-epithelialization of the central portion and wedge resection [4]. Edge resection and suturing can directly remove excess skin tissue at the edge of the labia minora, so the surgical technique is simple and reliable, but it destroys the natural shape of the free edge of the labia minora [5]. De-epithelialization of the central portion preserves the natural boundary of the labia minora, the blood vessels and nerve bundles in the central region, and it can ensure the normal shape and sensation of the labia minora after surgery, but simple removal of skin from the labia minora cannot remove a sufficient amount of hypertrophic tissue [6, 7]. Tissue wedge resection preserves the natural shape of the free edge of the labia minora; however, it can damage the central blood vessels and nerve bundles, increase the risk of ischemic necrosis in the distal labia minora and reduce the original skin sensitivity [8–12].

As a sandwich-like anatomical structure, the labia minora include mucosa and submucosa, blood vessels and nerve bundles, lateral subcutaneous tissue and skin tissue [7]. From a blood supply and innervation perspective, the labia minora can be divided into medial and lateral parts with a common central blood supply and nerve bundles. To preserve the blood vessels and nerve bundles in the central region of the labia minora, the medial and lateral hypertrophic tissues can be excised separately without affecting the blood supply and nerve innervation in the distal labia minora. This procedure was first simulated on a fresh cadaver, which showed that dissection via the loose tissue space between the medial and lateral skin of the labia minora can effectively remove the hypertrophic tissue without damaging the blood vessels and nerve bundles in the central region. We have also noticed that when the medial and lateral hypertrophic labia minora tissues are removed, the preserved central region, including the blood vessels and nerve bundles, is very thin, and damage to the central region is inevitable in the conventional operation. Protection of the vessels and nerve bundles in the central region during the actual operation and the prevention of

Table 2 Follow-up questionnaire

Patient	Follow-up (M)	Complications	Results		
			Esthetic	Function	Sensitivity
1	6	None	Very satisfaction	Normal	No change
2	10	None	Satisfaction	Improve	No change
3	8	None	Very satisfaction	Improve	No change
4	9	None	Satisfaction	Normal	No change
5	6	Small dehiscence of the incision	Very satisfaction	Normal	No change
6	7	None	Satisfaction	Improve	No change
7	6	None	Satisfaction	Improve	No change
8	13	None	Satisfaction	Normal	No change
9	6	None	Satisfaction	Improve	No change
10	12	None	Satisfaction	Normal	No change
11	9	None	Satisfaction	Normal	No change
12	10	None	Satisfaction	Improve	No change
13	9	None	Satisfaction	Normal	No change
14	8	None	Satisfaction	Normal	No change
15	11	None	Very satisfaction	Improve	No change
16	9	None	Satisfaction	Normal	No change
17	14	None	Satisfaction	Improve	No change
18	10	None	Satisfaction	Normal	No change
19	7	None	Satisfaction	Improve	No change
20	6	None	Satisfaction	Normal	No change
21	9	None	Satisfaction	Normal	No change

traction injuries are the keys to the success of this procedure. We, therefore, aimed to modify the conventional method, i.e., complete resection of the medial and lateral hypertrophic tissues of the labia minora followed by suturing of the wound. In practice, the medial mucosa of the labia minora was first incised, and separation of the loose tissue space of the submucosal layer was performed. After removing the medial mucosa and hypertrophic submucosal tissues, the medial incision was sutured immediately to restore the integrity of the medial mucosal and submucosal tissues of the labia minora. Next, a fusiform incision was made in the lateral labial minora sulcus to complete the removal of the lateral hypertrophic tissue. Finally, the wound was closed. Because the continuity of the medial and lateral tissue of the labia minora is maintained throughout the procedure, the thin central region of blood vessels and nerve bundles is protected during surgery to avoid traction and damage due to its complete exposure.

By modifying the traditional method of posterior-lateral wedge resection of the labia minora, this method preserves the central region, including the blood vessels and nerve bundles, prevents ischemia and necrosis of the distal labia minora, and preserves the skin sensitivity of the labia minora. During the procedure, preservation of the central region, including blood vessels and nerve bundles, can help to prevent crossover and overlap between the medial and lateral incisions, thereby preventing poor healing of the incision and reducing the chance of dehiscence. In contrast to the conventional method of removing the intact hypertrophic labia minora, our method does not treat the hypertrophic labia minora as one integrated part; instead, our method divides the hypertrophic labia minora into medial and lateral parts with a common central region that includes blood vessels and nerve bundles. As a novel hypertrophic labia minora reduction option, the surgical procedures for the two parts are designed and performed separately.

Conclusions

The method used achieves the effective reduction of hypertrophied labia minor with invisible scars, and a natural postoperative appearance. Posterior-lateral wedge resection with preservation of the central blood vessels and nerve bundle can avoid the risk of ischemic necrosis in the distal labia minora, and ensure the original sensation of the labia minora after surgery. Our method is a simple and safe hypertrophic labia minora reduction option that is worthy of promotion.

Compliance with Ethical Standards

Conflict of interest The authors declare that they have no conflict on interest.

Informed Consent This study was a retrospective review of patients who underwent surgery after review in our outpatient clinic. We obtained institutional review approval and patients' consent prior to their inclusion in this study. Data were only collected from the patient case notes that were accessible to the authors. All data collected were made anonymous to preserve patient confidentiality. The collection of the data and the results of this study did not impact any aspect of patient management. Patient consent was obtained for the publishing of their medical photographs.

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