

Reduction Clitoroplasty by Ventral Approach: Technical Refinement

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Abstract

Background Aesthetic alteration of the genitalia is increasingly sought by women who are unhappy about the size, shape or overall appearance of their vulva. Clitoral hypertrophy is usually seen in congenital malformations, specifically in intersexual stages of hormonal expression. A large clitoris has an appearance of a small penis, is psychologically disturbing and interferes in sexual activity.

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Purpose Clitoral reduction surgery has evolved over the years. Total clitorotomy, clitoral recession and neurovascular pedicle sparing clitoroplasty can be considered as three major milestones in its evolution. In nerve sparing clitoroplasty, earlier dorso-lateral approach was challenged by ventral approach, which is establishing itself as the approach of choice by its own merits. Clitoral reduction surgery being not a very commonly performed surgery, demands refinements in its technique to improve its results and particularly the aesthetic outcome, which is gaining more importance in recent years.

Methods An adult case of late onset congenital adrenal hyperplasia (CAH) with clitoromegaly underwent nerve sparing reduction clitoroplasty by ventral approach under moderate magnification. We present key points of the preoperative anatomic evaluation. Technical refinements planned and executed step wise during the procedure resulted in satisfactory outcome.

Result Patient now has normal appearing genitalia, a small clitoris nicely covered by skin hood and very well preserved sensation to light touch.

Conclusions Preservation of sensation in the glans clitoris is of paramount importance during clitoral reduction surgery. Knowledge of the anatomy of the neurovascular supply to the glans clitoris gives us freedom from not isolating it in order to preserve it. In fact a deliberate attempt to dissect it can prove detrimental particularly when operating on a smaller organ during childhood. A ventral approach with refined technique proves safe and gives satisfactory result. Moderate degree of magnification eases dissection. A component-based detailed preoperative planning improves the overall aesthetic appearance of the female genitalia.

Keywords Clitoral hypertrophy · Clitoromegaly · Reduction clitoroplasty · Nerve sparing ventral clitoroplasty · Ambiguous genitalia · Phalloplasty

Introduction

Aesthetic alteration of the genitalia is increasingly sought by women unhappy with the size, shape, or appearance of their vulval components. Clitoral hypertrophy is usually seen in congenital malformations, specifically in intersex states caused by disturbances of hormonal expression. Usually, they are obvious at birth. When the clitoral hypertrophy develops later the underlying aetiology should be explored and acquired causes considered. These acquired forms of clitoral hypertrophy are either of hormonal or of non-hormonal origin. In the hormonal causes, an androgen excess is the main contributing factor for the clitoral enlargement, excessive facial and body hair, and virilisation.

The term congenital adrenal hyperplasia (CAH) encompasses a group of autosomal recessive disorders, each of which involves a deficiency of an enzyme involved in the synthesis of cortisol, aldosterone, or both. Deficiency of 21-hydroxylase, resulting from mutations or deletions of *CYP21A*, is the most common form of CAH, accounting for more than 90% of cases.

The surgical goals are achievement of a normal appearance of the genitalia with preservation of sensation in the clitoris, as loss of sensation in the clitoris is disabling with inability to achieve orgasm. Surgery for clitoral enlargement has gone through evolution. The earliest surgery done was clitorotomy which is no longer acceptable. Next was clitoral recession involving repositioning of the clitoris under the symphysis pubis. This procedure has a disadvantage that engorgement of the clitoris during sexual stimulation can be painful and also it can interfere with micturition. Therefore, clitoral reduction should involve removal of all erectile tissue from the corpora cavernosa of the clitoris with preservation of the neurovascular supply to the glans clitoris [1]. The neurovascular structures to the glans clitoris course on the dorsal aspect of the shaft of the clitoris deep to Buck's fascia. The customary approach to the reduction has been by the dorso-lateral approach where these structures are identified, isolated, and protected while the erectile tissues are removed [2]. A newer ventral approach was adopted in this case where the erectile tissues are excised without disturbing the neurovascular structures. This technique results in better preservation of sensation in the clitoris and therefore increased sexual satisfaction.

We present a case in which sensation preserving clitoral body and hood reduction was done through a ventral approach. Key points in the preoperative anatomic evaluation, technique selection and refinement, and peri operative care are highlighted.

Clinical Presentation

This girl presented at the age of 20 years with complaints of an enlarged clitoris. Examination of the genitalia showed an enlarged clitoris resembling penis. The labia majora were normal with no rugosity but had fusion at fourchette and the labia minora were redundant. The urethral meatus was caudally located (hypospadiac). The introitus was small with the presence of hymenal ring (Fig. 1). Clitoromegaly was significant with a penile appearance. Clitoral length measured 2.8 and 3.8 cm without and with stretching, respectively, in the non-arousal state. She was hirsute with coarse terminal hairs in beard area as well on extremities. She had small breasts and was short statured (height 138 cm or 4 feet 6½ inch). Her blood pressure was normal. Karyotyping revealed that



Fig. 1 External genitalia of a 20-year-old girl. Hypertrophied clitoris resembling penis measured 2.8 cm without and 3.8 cm with stretching with a glans diameter of 1.5 cm. Labia minora are redundant, urethral meatus is caudally located and introitus is small with an intact hymenal ring

patient was genotypically a normal female (46XX). Ultrasound examination of the abdomen and pelvis did not reveal adrenal hyperplasia and uterus; cervix and both ovaries were normal. Her FSH (5.79 mIU/ml) and LH (7.44 mIU/ml) levels were in normal range, but prolactin (43.65 ng/ml) and testosterone (3.08 ng/ml) were raised. A diagnosis of late onset congenital adrenal hyperplasia (CAH) with clitoral hypertrophy was made. She was put on cortisol therapy and taken up for nerve preserving reduction clitoroplasty.

Surgery was performed under general anaesthesia in lithotomy position with thighs abducted, legs well supported on padded stirrups. An indwelling urinary catheter was put in and a stay suture placed on the glans clitoris to ease its handling and to keep it in traction.

Surgical Procedure

Degloving of Clitoris

Surgery was carried under a self-illuminated magnifying glass providing about 2× magnification which we found

sufficiently comfortable. The clitoris was degloved till its roots. A circumferential incision was marked 1 cm proximal to corona on the inner prepuceal layer. In contrast to the conventional incisions described at just 3–4 mm, this preserves prepuceal skin which later on nicely covers the reduced glans clitoris in a naturally hooded way. Clitoral shaft was circumferentially and completely degloved of its skin cover till its roots, but the skin envelope was left attached proximally at this stage. Care was taken to keep all soft tissue of the dorsal 1 cm wide strip on the tunica albuginea to safeguard the neurovascular pedicle. We found it convenient to start dissecting corpora cavernosa from ventral side near its distal end inserted into the glans and then proceed proximally on the shaft. Here again, care was taken to remain on the side of corpora on dorsum to avoid injury to the NV pedicle. Once the corpora were dissected from the dorsal NV pedicle containing strip, till their bifurcation under the symphysis pubis, they were severed separately and sharply after applying a haemostat. Their severed ends were closed with a continuous suture of 5-0 chromic catgut to achieve haemostasis. Any minor bleeders were diathermised. Now you have a thin dorsal strip containing dorsal arteries, nerves, and deep dorsal vein of clitoris under Buck's fascia supplying the glans (Fig. 2).



Fig. 2 Clitoris was degloved till its roots and both the corpora were completely excised leaving a thin dorsal strip of Buck's fascia containing dorsal nerves and blood vessels of glans clitoris

Glans Reshaping

Glans reduction is done by keeping a narrow dorsal and dorso-lateral crescent of corona glandis from 9 to 3 O’ clock position and excising the rest along with its attached cuff of prepuce (Fig. 3). By pulling forward on a skin hook placed at the centre of coronal crescent its lateral wings come or just fall together and when sutured with 5-0 chromic catgut they give a very good round dome shape to the neo glans clitoris.

Trimming the Skin

Next, the skin tube which was left attached proximally is split in mid-dorsal line just 1 cm short of its base and pulled forward to mark excess to be trimmed. This centimetre of mid-dorsal skin gives natural sloping appearance to the neo hood clitoris. As this skin is in continuation with labia minora below, we need to decide how slim we desire to have labia minora and trim only the excess.



Fig. 3 Drastic reduction of glans is done by keeping a narrow dorsal and dorso-lateral crescent of corona glandis from 9 to 3 O’ clock position and excising the rest along with its attached cuff of prepuce skin

Glans Anchoring

When the prepuce skin attached to the trimmed glans is sutured to the uppermost end of skin cut, glans tends to pop out due to the bulk of the NV pedicle strip behind; therefore, it needs to be anchored. This is done by two sutures of 3-0 chromic catgut taken from lateral margins of dorsal NV strip near glans and anchored at the depth by a deep bite through soft tissue on the under surface of symphysis pubis. This manoeuvre retracts the glans backwards and upwards in its hood and gives that natural look when the oedema subsides [Fig. 4 (inset)].

Edges of the trimmed labia minora and released labia majora at fourchette were sutured with chromic catgut. The postoperative recovery was uneventful. Patient now has normal appearing genitalia and a sensate clitoris with good preservation of sensation to light touch (Fig. 4).

Discussion

Crouch et al. [3] studied the sensory thresholds in patients of CAH who had undergone feminising genital surgery and found significant impairment of sensitivity in the clitoris compared to controls as well as those unoperated.



Fig. 4 Normal appearance of genitalia. Inset reveals glans clitoris within its hooded skin

Murakami et al. [4] used operating microscope with 8× magnification for dissecting NV bundle. We feel such a high magnification is unnecessary particularly in an adult. Kujur et al. [5] claim to separate dorsal NV bundle along with the extensive network of nerves to the glans around the end of corporeal bodies. Separating corpora from their apices under the glans clitoris proximally helps in preserving this network and keeping the NV bundle attached to the under surface of Buck's fascia strip dorsally safeguards NV bundle. Therefore, it is very important to perform clitoral reduction through a 'safe ventral channel'.

Conclusion

Preservation of sensation in the glans clitoris is of paramount importance during clitoral reduction surgery. Knowledge of the anatomy of the neurovascular supply to the glans clitoris gives us freedom from not isolating it in order to preserve it. In fact, a deliberate attempt to dissect it can prove detrimental particularly when operating on a smaller organ during childhood. A ventral approach with refined technique proves safe and gives satisfactory result. Moderate degree of magnification eases dissection. A component-based detailed preoperative planning can improve the overall aesthetic appearance of the female genitalia.

Compliance with Ethical Standards

Conflict of interest All authors declare that they have no conflict of interest.

Human and Animals Rights This was a single case operative study done with due consent. There were no other human or animal participants. All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Declaration of Helsinki 1975, as revised in 2008 (5).

Informed Consent Informed consent was duly obtained from the patient and her parents prior to the surgical procedure.

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