

Improved Gynecomastia Surgery: Power-Assisted Liposuction With Stab-Flatten Technique Without Resection

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Abstract

Background: Gynecomastia, the enlargement of male breast tissue, significantly impacts both physical and psychological health. Surgical intervention is often necessary, utilizing various techniques to reduce glandular and fatty tissue. This paper introduces an innovative surgical method combining power-assisted liposuction with the stab-flatten technique to enhance precision and cosmetic results. We present our clinical experience and evaluate its effectiveness in gynecomastia treatment.

Methods: From June 2021 to January 2023, 128 gynecomastia patients underwent power-assisted liposuction and the stab-flatten method via a single axillary incision. We collected demographic and clinical data, including surgery duration, complications, and patient satisfaction regarding physical appearance, mental state, and social interactions. The BODY-Q questionnaire was used preoperatively and 3 months postoperatively for assessment.

Results: The study included 128 male patients, treating 252 breasts, with an average age of 35 years and a mean BMI of 27.7 kg/m². Most procedures were bilateral (96.9%), with an average fat removal of 224.5 mL and a surgery duration of 147 minutes. The complication rate was low at 2.0%, with bruises in 5 breasts. The average hospital stay was 2 days. Significant improvements were noted in BODY-Q scores for appearance satisfaction and health-related quality of life, with increased appearance satisfaction and reduced appearance-related distress.

Conclusion: Since June 2021, the combined use of power-assisted liposuction and the stab-flatten technique has been effective in managing gynecomastia. This synergistic approach not only achieves aesthetically pleasing outcomes but also minimizes the surgical risks associated with traditional methods.

Keywords

gynecomastia, liposuction, surgical techniques

Introduction

Gynecomastia, defined by the benign proliferation of glandular breast tissue causing breast enlargement in males, is a condition with diverse prevalence rates across different age groups and populations. Comprehensive diagnostics including detailed anamnesis, physical examination, hormone assays, and ultrasonography are essential to ascertain its etiology and exclude potential differential diagnoses such as breast tumors or systemic diseases. Prevalence rates in adolescent males vary from 4% to 69%, and between 32% and 65% in adult males.¹ Approximately 25% of cases are idiopathic, with another quarter due to persistent gynecomastia originating from puberty.² Additional causes include drug reactions (10%–20%), cirrhosis or malnutrition (8%), primary hypogonadism (8%), testicular tumors (3%), secondary hypogonadism (2%), hyperthyroidism

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(1.5%), and renal disease (1%).² The underlying pathogenesis involves an imbalance between estrogenic and androgenic activity, where estrogen stimulates breast tissue growth, countered by androgens. The initial phase includes ductal epithelial proliferation, stromal and connective tissue hyperplasia, and edema, transitioning over 1 to 2 years to fibrosis with collagen deposition, resulting in periductal fibrosis and hyalinization.³ Surgical correction is indicated once fibrotic transformation occurs.

Surgical intervention for gynecomastia is generally considered for symptomatic relief and cosmetic reasons, particularly when medical treatments prove insufficient.⁴ Common surgical methods include suction lipectomy or excision via a periareolar incision.⁵ Although widely practiced, these methods may cause complications such as contour irregularities, nipple-areola complex deformation, incomplete glandular resection, ischemia, necrosis, and hypertrophic scarring.⁶ Furthermore, subcutaneous mastectomy, while effective, often leaves visible scarring that can psychologically impact patients, especially adolescents, leading to dissatisfaction with cosmetic outcomes. This highlights a need for less invasive techniques that optimize aesthetic results and minimize complications.

This paper presents a novel approach combining power-assisted liposuction with the stab-flatten technique, which uses specialized liposuction cannulas to disrupt fibroglandular tissue, allowing for precise contouring through a single lateral inframammary incision. Since its introduction in January 2020, we have successfully applied this method in 128 consecutive patients, demonstrating its effectiveness across various stages of gynecomastia. This technique consistently achieves natural male breast contours and favorable aesthetic outcomes with minimal scarring, as the incisions are strategically placed and inconspicuous.

Patients and Methods

A comprehensive retrospective analysis was conducted on 128 consecutive male patients (252 breasts) diagnosed with gynecomastia grades I or II, as per the Simon classification system, who underwent treatment by a single surgeon from June 2021 to January 2023. To minimize selection bias, we implemented strict inclusion and exclusion criteria. Inclusion criteria required patients to be aged 18 years or older, with a diagnosis of gynecomastia grades I or II, devoid of prior surgical interventions for breast conditions.⁷ Excluded were patients with a history of hormone therapy, drug use (including anabolic steroids), endocrine disorders, or those exhibiting clinical or radiological signs of breast malignancies. Additionally, patients with significant psychiatric disorders affecting their perception of surgical outcomes and those unable to adhere to postoperative care were also excluded.

Follow-up evaluations were meticulously conducted by the senior author at specified intervals postoperatively.

Patients were assessed at 3 months after surgery, during which their quality of life was measured using the Body-Q questionnaire, addressing satisfaction with physical appearance, mental well-being, and social interactions. Detailed demographic data, including age and BMI, as well as procedural specifics such as the volume of adipose tissue removed and duration of the operation, were collected and analyzed. This structured follow-up process aimed to provide a comprehensive view of the surgical outcomes and ensure the efficacy of the treatment protocols employed. The study was approved by the institutional ethics committee, and written informed consent for the use of clinical images was obtained from each patient.

Operative Technique

Skin Marking and Infiltration. Prior to initiating the surgical procedure, the patient is carefully positioned upright to accurately mark the areas designated for liposuction. The demarcation extends beyond just the perimeter of the nipple-areola complex to include regions showing fatty tissue accumulation, ensuring thorough and aesthetically pleasing breast contouring. This method also ensures a smooth integration of the nipple-areola complex with adjacent tissues, preventing the formation of a recessed appearance.

After anesthesia induction, the patient is repositioned in a supine orientation, and a precise 4-mm stab incision is made at the inframammary crease along the anterior axillary line to begin the infiltration process. The infiltration targets the subcutaneous layer first and then deeper into the breast tissue, using a specially prepared solution composed of 1000 mL of 0.9% sodium chloride, 20 mL of 2% lidocaine, and 2 mL of 1:1000 epinephrine for each breast. This carefully crafted solution is designed to enhance tissue manipulation and reduce discomfort during the procedure.

Power-Assisted Liposuction for Removal of Fatty Breast Tissue

Power-assisted liposuction is employed as a crucial technique in managing excess breast volume, primarily due to adipose tissue accumulation. This method is particularly effective due to its ability to adeptly navigate the dense fibrous parenchymal network within the breast. The procedure initiates by targeting the entire breast area, focusing specifically on the middle layer of subcutaneous fat. Attention is then shifted to the subdermal layer just beneath the nipple-areola complex, where liposuction is carefully performed to encourage skin contraction in the postoperative period. This calculated approach not only ensures a significant reduction in breast volume but also enhances the aesthetic outcomes post-surgery, achieving a more contoured and pleasing appearance.

The Stab-Flatten Technique for Remodel of Fibroglandular Breast Tissue

The Stab-Flatten technique employs narrow-gauge liposuction cannulas (Ke Yi Zhen Yan Shan Corporation, Beijing, China; 35 mm diameter with a length of 30 cm) to meticulously disrupt the subdermal attachments of fibrous breast tissue and the lactiferous duct connections to the nipple. This technique allows for the fragmentation of tissue through the liposuction incision rather than its removal. Special attention is given to the disruption of subdermal breast tissue beneath the nipple-areola complex to avert the formation of concave deformities. If fibroglandular breast tissue is present, it is carefully flattened to optimize aesthetic outcomes. A liposuction needle is inserted through the incision, and fibroglandular breast tissue is strategically disrupted through a “stab” motion while concurrently pinching the skin with the other hand to enhance precision. This process continues until the ribs can be palpated and no glandular texture is felt upon compression, at which point the procedure may be concluded (see Figure 1). In this procedure, no tissue is removed. Instead, the tissue is merely fragmented by the liposuction cannula and flattened.

These critical attachments include the lactiferous ducts and Cooper’s suspensory ligaments, which connect to the deep fascia. Their inherent fragility eliminates the need for sharp dissection within this deep plane. Disruption of these structures is pursued until the skin texture of the breast is smooth and the underlying fibroglandular breast tissue is no longer palpable. This detailed application of the technique allows for significant reshaping of the fibroglandular tissue beneath the nipple-areola complex, thus achieving extensive aesthetic enhancements.

Extreme care is exercised to prevent any depressions under the nipple-areola complex and around the mastectomy flaps. Each breast is examined for asymmetry and subcutaneous roughness, with additional liposuction

performed as needed. No drain is placed, and the incisions are closed using an inverted deep dermal 5-0 Monocryl suture, then temporarily secured with #7-0 nylon sutures.

Postoperative Management

After the procedure, it is crucial for the patient to consistently wear a compression garment day and night for a period ranging from 3 to 6 months. This regimen is vital for ensuring the optimal adherence of the breast skin to the underlying tissues, which is key to successful healing. Patients are typically able to resume their usual activities around 3 weeks postoperatively, assuming there are no complications or contraindications. Adhering to this structured postoperative protocol is essential not only for achieving favorable outcomes but also for maximizing patient comfort during the recovery phase.

Statistical Analysis

The study’s findings were evaluated using the Statistical Package for the Social Sciences (SPSS) version 25.0 (IBM Corp., Armonk, NY, USA). Patient satisfaction regarding physical appearance, mental status, and social interaction was quantified using a 10-point Visual Analog Scale (VAS). Analytical methods included descriptive statistics and t-tests. Continuous variables were expressed as mean \pm standard deviation (SD). A *P*-value of less than 0.05 was considered statistically significant, denoting the threshold for establishing the reliability of the results.

Results

The integration of power-assisted liposuction and the stab-flatten technique has proven effective in managing gynecomastia in patients with various levels of severity.

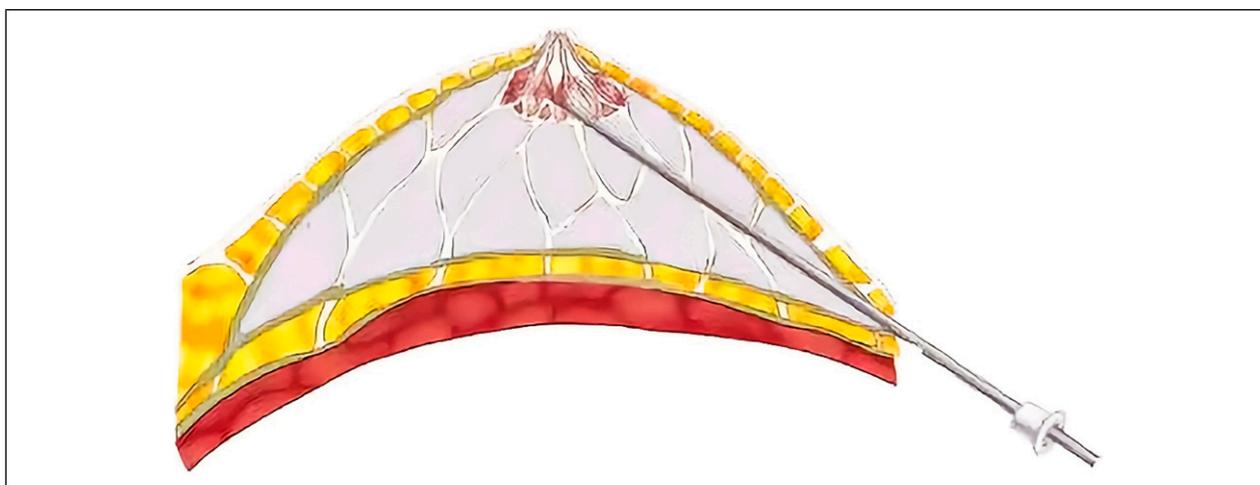


Figure 1. Illustration of the stab-flatten technique.

The study involved participants with an average age of 35 years (ranging from 18 to 51 years) and an average body mass index (BMI) of 27.7 kg/m² (ranging from 25.0 to 29.9 kg/m²). A majority of the procedures were bilateral, conducted in 124 (96.9%) patients, while unilateral procedures were performed in 4 (3.1%) patients. Consistently across all cases, power-assisted liposuction was performed, removing an average of 224.5 mL of tissue (ranging from 80 to 376 mL). The average duration of the operations was 147 minutes (ranging from 54 to 174 minutes). The median duration of postoperative hospital stay was 2 days (ranging from 1 to 3 days).

Of the 128 patients and 252 treated breasts in this series, complication was noted in 5 breasts (2.0%). Bruises occurred in 5 breasts, managed conservatively using compression bandages. (Table 1) Bruising primarily resulting from the surgical incisions and manipulation of breast tissue that may lead to vascular injury. This trauma to the blood vessels causes them to rupture or leak, allowing blood to escape into the interstitial tissue spaces. The accumulation of this blood outside the vessels manifests as the discoloration commonly observed in bruising. Notably, none of the patients required revisions for issues such as excess skin, suboptimal breast contour, or nipple deformities. These results highlight the safety, efficacy, and satisfactory

outcomes of employing this combined surgical approach in the treatment of gynecomastia. (See Figures 2–4 for visual reference).

BODY-Q Scales

Appearance Satisfaction. The study employed the BODY-Q scales to assess patients' satisfaction with their appearance and overall quality of life. Specifically, satisfaction levels concerning body, chest, and nipple-related appearance were quantitatively measured. Preoperatively, the median satisfaction scores were recorded as 52 (ranging from 31 to 70), 44 (ranging from 21 to 71), and 55.5 (ranging from 15 to 85) for body, chest, and nipples, respectively. Postoperatively, these scores saw significant improvements, rising to 90.5 (ranging from 85 to 100), 91.5 (ranging from 82 to 100), and 91 (ranging from 83 to 100) points, respectively.

These enhancements in patient satisfaction were observed as early as the third postoperative month and were statistically significant, with *P*-values less than .001 for body and chest satisfaction and less than .01 for nipple-related satisfaction, indicating a marked improvement in the perceived appearance and associated quality of life post-treatment. These findings are detailed further in Table 2.

Table 1. Demographic and Operative Clinical Data of the Patients.

		N = 128
Characteristics (n = 128)	n (%)	Median (Minimum–Maximum)
Age		35 (18-51)
BMI		27.7 (25.0-29.9)
Breast surgery		
Unilateral	4 (3.1)	
Bilateral	124 (96.9)	
Grade		
Grade 1	24 (18.8)	
Grade 2	104 (81.2)	
Liposuction amount of (cc)		224.5 (80-376)
Duration of stab-flatten procedure (min)		72 (29-88)
Duration of liposuction (min)		51.5 (25-70)
Total surgical duration (min)		147 (54-174)
Postoperative hospital stay (days)		2 (1-3)
Follow-up time (month)		8.5 (3-12)
Complication	5 (2.0)	
Bruises	5 (2.0)	
Hematoma	0	
Seroma	0	
Contour irregularity	0	
Scar hypertrophy	0	
Nipple-areola complex necrosis	0	
Nipple hypesthesia	0	

BMI = body mass index.



Figure 2. Photographs of a 38-year-old male with gynecomastia. (A, B) Preoperative view; (C, D) View of 2 days after surgery; (E, F) View of follow-up at 1 months after surgery.

Health-Related Quality of Life

The improvement in patient well-being following the surgical treatment of gynecomastia was also reflected in significant changes in appearance distress and social functioning. Preoperatively, the median level of appearance distress among patients was recorded at 44.5 points (ranging from 21 to 65),

which substantially decreased to 9 points (ranging from 0 to 18) in the early postoperative period. This reduction was statistically significant with a P -value less than .05.

Additionally, the level of social function-related quality of life saw noticeable improvement. Preoperative scores averaged 70 points (ranging from 61 to 80), which increased to 88 points (ranging from 75 to 100)



Figure 3. (A) Preoperation and (B) postoperation pictures of adult male patients.



Figure 4. Pictures of adult male patients Preoperative (A) and early postoperative (B) images of a patient who underwent stab-flatten technique and liposuction.

postoperatively. This enhancement also achieved statistical significance with a P -value less than .05. These findings are comprehensively detailed in [Table 2](#), illustrating the substantial impact of the surgical intervention on the patients' psychological and social well-being.

Discussion

According to statistics from the American Society for Aesthetic Plastic Surgery (ASAPS), there has been a noticeable increase in the number of men undergoing gynecomastia surgery annually, making it the third most popular cosmetic procedure, following only liposuction and blepharoplasty.⁸ Gynecomastia, which involves the benign enlargement of male breast tissue due to an

imbalance between endogenous estrogen and androgen hormones,⁹ frequently leads patients to seek surgical solutions due to psychological distress and a desire for an improved cosmetic appearance, often before any pathological changes occur.¹⁰

In response to the growing demand, the focus of gynecomastia surgery has shifted towards techniques that offer smaller incisions, fewer complications, and quicker recovery times. This shift has encouraged surgeons to develop new, less invasive methods that still deliver satisfactory results.^{4,11-13}

Traditionally, 3 main surgical techniques are employed in the treatment of gynecomastia: conventional lipectomy, subcutaneous mastectomy, and a combination of both. The male breast, predominantly composed of fatty tissue

Table 2. Preoperative and Postoperative BODY-Q Scores.

BODY-Q score	Preoperative			Postoperative			P-value
	Median	Min.-Max	Mean \pm SD	Median	Min.-Max	Mean \pm SD	
Appearance satisfaction							
Body	52	31-70	51.77 \pm 11.70	90.5	85-100	92.38 \pm 4.59	<i>P</i> < 0.001 ^a
Chest	44	21-71	46.08 \pm 14.56	91.5	82-100	90.80 \pm 5.85	<i>P</i> < 0.001 ^a
Nipples	55.5	15-85	52.32 \pm 22.02	91	83-100	91.63 \pm 5.18	<i>P</i> < 0.001 ^a
Health-related quality of life							
Appearance distress	44.5	21-65	44.01 \pm 13.30	9	0-18	9.05 \pm 5.07	<i>P</i> < 0.001 ^a
Social function	70	61-80	69.75 \pm 5.66	88	75-100	87.75 \pm 7.67	<i>P</i> < 0.001 ^a

^a*P* < .05, Paired sample *t* test; Min: Minimum, Max: Maximum, SD: Standard Deviation.

with fewer ducts and stroma, undergoes notable changes in gynecomastia, with ducts becoming hyperplastic and dilated and periductal tissue along with surrounding stroma undergoing fibrosis while intraglandular fat increases. Several liposuction techniques—including syringe liposuction, suction-assisted liposuction, power-assisted liposuction, and ultrasound-assisted liposuction—have been recognized as less complex and capable of minimizing visible scarring by creating a superficial plane between the skin and breast tissue.^{9,14}

Liposuction is consistently valued as a crucial adjunctive technique in the treatment of true gynecomastia due to its minimally invasive nature and superior contouring capabilities. However, despite these benefits, liposuction methods often serve as preliminary steps to open excision due to the higher recurrence rates associated with these procedures.¹⁵

In our study, liposuction played a pivotal role in the surgical management of all gynecomastia cases, tailored specifically to the distribution and characteristics of adipose tissue in each patient, while preserving retroglandular fat to prevent the flap from adhering directly to the deep fascia, which could result in deformities during muscular contraction. Particularly in overweight patients, maintaining a thicker flap is crucial to achieve a contour that aligns seamlessly with their chest profile.

The differentiation between adipose and glandular tissues preoperatively poses a significant challenge; therefore, we advocate for initiating the procedure with liposuction in almost all gynecomastia cases. This strategy simplifies the subsequent correction of peripheral contours and delineation of glandular tissues. Power-assisted liposuction, being readily available and effective, is instrumental in achieving these objectives.¹²

Liposuction may be employed either as a standalone approach or in conjunction with other surgical techniques in gynecomastia treatment. This is particularly relevant in cases with excessive subcutaneous adipose tissue, where the extent and thickness of tissue remaining after removal vary significantly among patients and require careful assessment by the surgeon. One of the key challenges

surgeons face is balancing the complete removal of disc tissue, which can lead to nipple retraction especially in larger, fatty breasts, against the risk of recurrence if tissue near the retroareolar disc is left intact. In such scenarios, the stab-flatten technique proves beneficial for correcting any potential depressions, asymmetries, or irregularities in the nipple-areola complex.

In this article, we detail our collective experience combining power-assisted liposuction with the stab-flatten technique through a single incision approach. Since its introduction in January 2020, this technique has been applied to 128 consecutive patients with a notably low complication rate. We advocate for the use of this method in treating various degrees of gynecomastia for multiple reasons.

Firstly, the integration of power-assisted liposuction significantly mitigates the physical strain typically associated with the removal of adipose tissue through dense breast parenchyma, thereby enhancing procedural efficiency. Comparative studies highlight the advantages of this technique, including reduced operator fatigue and improved fat removal rates, which are crucial factors in achieving optimal outcomes.

In contrast to traditional methods that employ clamps, scalpels, or scissors, the use of small-diameter liposuction cannulas facilitates effective reshaping of substantial volumes of fibroglandular tissue beneath the nipple-areola complex through a minimal, peripherally placed incision. This innovative approach not only allows for more precise contouring but also minimizes the risk of complications commonly associated with larger incisions.

Furthermore, our technique offers several key advantages over conventional open surgical approaches. These include minimal incisions, reduced tissue trauma, enhanced nipple viability, and expedited healing times. A particularly noteworthy benefit is the minimal scarring observed; our patients reported no dissatisfaction regarding scars, with no circumareolar scars and only minimal scarring at the incision site. This contrasts sharply with traditional surgical methods, where larger incisions can lead to more pronounced scarring and longer recovery times.

From an economic standpoint, our technique is cost-effective, relying on a straightforward suction method without the need for vibration amplification of sound energy at resonance or ultrasound guidance, which can increase procedural costs in other techniques. Additionally, we found no significant correlation between the use of suction drains and postoperative complications like hematomas or seromas, aligning with existing evidence suggesting that drains do not provide substantial benefits following reduction mammoplasty.¹⁶ The absence of drain use post-surgery also contributes to shorter hospital stays and lower overall costs.

However, it is important to note that this technique is not suitable for patients requiring skin excision. In our series, none of the patients developed surgical site infections, contrasting with reports from other studies.¹⁷ While the standard of care concerning the use of drains after gynecomastia surgery varies among surgeons, our findings support a drain-free approach to these procedures.

Given the detectability of fibroglandular breast tissue through palpation, we have not found it necessary to utilize minimal access excision techniques under direct vision or with endoscopic assistance as others have suggested. Our approach, which relies predominantly on tactile assessment, has proven effective without the occurrence of bleeding complications. The use of epinephrine in the tumescent solution significantly reduces the risk of bleeding, thereby eliminating the necessity for drain placement. Importantly, we did not observe any concave deformities of the nipple-areola complex, a complication frequently associated with open excision techniques. We attribute this favorable outcome to careful tissue management and tension distribution, which together prevent excessive removal of tissue beneath the nipple-areola complex.

Patients suffering from gynecomastia often experience anxiety, depression, and social phobia. Not only does successful surgical intervention cosmetically enhance the chest area, but it also significantly improves psychological well-being. Correspondingly, in our study, the mental and social environment satisfaction levels, assessed using the BODY-Q scales, were notably high among patients post-gynecomastia surgery. This method, therefore, stands as a viable alternative for the surgical treatment of gynecomastia, particularly suitable for experienced surgeons handling cases that do not require skin excision.

Although our results are promising, we must acknowledge the limitations of this study, including a small sample size and a short follow-up period. These factors may limit our ability to fully assess the long-term effectiveness of the procedure. Future studies will aim to increase the sample size and extend the follow-up duration to obtain more representative and reliable long-term data.

It is noteworthy that this procedure is not recommended for novice surgeons due to the intricate

manipulation of glandular tissue involved. For patients classified with grade III gynecomastia, the prevailing surgical strategy often involves mastectomy with skin resection.⁶ In certain cases, achieving optimal results may necessitate integrating liposuction with other techniques, such as skin-sparing mastectomy, pedicled nipple-areola complex (NAC) flaps, or free NAC grafts. These methods underscore the need for experienced surgical teams in managing severe gynecomastia to optimize patient outcomes. Future research will aim to collect and analyze long-term data to provide a deeper understanding of the durability of the results and patient satisfaction over time.

Conclusions

The combination of power-assisted liposuction and the stab-flatten technique has proven highly effective in the management of gynecomastia, achieving excellent aesthetic results with a low incidence of complications. This approach excels in sculpting a naturally contoured male breast while minimizing scarring, typically leaving only a single, barely noticeable scar. This method has consistently demonstrated its ability to provide not only significant cosmetic enhancements but also to do so with minimal surgical impact.

Author Contributions

Conception and design: Liu Chaohua. Analysis and interpretation: Ma Ying and Song Baoqiang. Data collection: Hao Dongyue, Sun Liming, Cang Zhengqiang, Xiao Bofu, Chen Yongjun and Qiao Haixia. Writing the article: Yan Bingwen. Critical revision of the article: Hao Dongyue.

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