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How to cite

DAELLENBACH, Patrick Peter. Anterior pelvic organ prolapse repair : the intersection of science and art. In: Gynecology and pelvic medicine, 2024, vol. 7, p. 17. doi: 10.21037/gpm-24-6

This publication URL: https://archive-ouverte.unige.ch/unige:179575

Publication DOI: 10.21037/gpm-24-6

Editorial Commentary

Anterior pelvic organ prolapse repair: the intersection of science and art

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Comment on: Fairclough E, Segar J, Breeman S, *et al.* Does variation of surgical technique affect native tissue anterior pelvic organ prolapse repair outcomes? Int Urogynecol J 2024;35:51-8.

Keywords: Anterior pelvic organ prolapse (anterior POP); pelvic floor repair; native tissue; colporrhaphy

Received: 12 January 2024; Accepted: 27 March 2024; Published online: 21 May 2024.

doi: 10.21037/gpm-24-6

View this article at: https://dx.doi.org/10.21037/gpm-24-6

Introduction

The landscape of pelvic floor reconstructive surgery has undergone significant transformations over the years. Among the myriad challenges that urogynecologists face, the repair of anterior pelvic organ prolapse (POP) stands out as a complex endeavour. Over the years, clinicians have explored a great number of surgical techniques and approaches to achieve optimal outcomes. However, the diversity of anatomical variations, coupled with the complexity of pelvic floor dynamics, has made anterior pelvic floor repair a subject of continuous scrutiny. The article under consideration, entitled "Does variation of surgical technique affect native tissue anterior pelvic organ prolapse repair outcomes?" (1) delves into the intricacies of this surgical domain, exploring the impact of surgical technique variations on outcomes. In our commentary, we make a journey through the history of anterior colporrhaphy, unravel the complexities of pelvic floor anatomy, and shed light on the delicate balance between art and science in the field of pelvic floor reconstructive surgery.

Historical evolution

The roots of anterior POP repair can be traced back to the 19th century, a time when gynaecologists were beginning to address the challenges posed by POP. The first true anterior colporrhaphy was performed in 1866 by Sims, followed by several variations in the 1870's described by other surgeons aiming to improve outcomes, which were suboptimal with a simple midline plication (2,3). In 1888, Manchester combined anterior vaginal wall repair with an apical repair in the form of an amputation of the cervix. It was further modified by Fothergill in 1912 transposing uterosacral ligaments to the anterior side of the cervix to add uterine support (4). It is interesting to note that this important relationship between anterior and apical defect was argued 100 years later by modern urogynecologists (5,6). In 1909, White was the first to suggest an operative procedure involving paravaginal lateral reattachment to reduce the risk of recurrence after simple midline plication, emphasizing that the poor results of anterior repair were the consequence of a misunderstanding of their aetiology (7). However, his theory of lateral attachment importance did not gain popularity and was ignored for the next 60 years, until Richardson and colleagues published an article dealing with new perspectives on pelvic floor relaxation causes (8). Moreover, paravaginal repair, performed either vaginally or via the abdominal route is also associated with failures and complications (9). During the last century, variations in surgical techniques emerged, each attempting to refine the anterior colporrhaphy procedure, but with no standardization of any of the single steps (10). In 2020, Fairclough *et al.* showed that many surgical techniques

were used in the UK, including fascial flap repairs, deep or superficial fascial dissections, varying types of sutures, modifications in the number of fascial layers or suture placements (11). Disappointing outcomes of anterior pelvic floor repair have encouraged surgeons to use natural and synthetic grafts to augment repairs, leading to new complications and no real benefit (12). The optimal management of anterior pelvic floor prolapse remains challenging and requires a personalized approach to address its various modes of presentation.

The complexities of pelvic floor anatomy

The pelvic floor is a dynamic structure which weaves together various tissues, including fascia, muscles, and nerves, all working in harmony to support the pelvic organs. When disruptions occur, as in the case of anterior POP, the challenge lies not only in repairing the visible defect but in navigating the intricate web of interconnected pathologies that extend beneath the surface. Attempts to address specific defects may overlook the broader interactions within this network, leading to incomplete repairs and potential failures. Indeed, complex lesions may extend beyond what is visible, affecting the delicate balance between fascial support, muscular function, and neurogenic control. Disruptions in this triad can lead to functional impairments, making the correction of anterior defects a formidable task that goes well beyond a simple surgical repair. The anterior vaginal wall, housing the bladder, is particularly vulnerable to prolapse due to its dynamic interaction with surrounding structures. The vagina has three layers, mucosa, muscularis, and adventia, but there is no such thing as a vaginal fascia itself (13). Therefore, vaginal reconstructive surgery for anterior POP is challenging. It may involve plication of thin layers, the muscularis and adventitia, whose composition varies and alters with age. Anterior POP also rarely exists in isolation. Many cases of anterior compartment prolapse coexist with apical defects, creating a synergistic relationship, where addressing one component while overlooking the other may result in incomplete correction, potentially contributing to recurrence (5,6). This concurrent involvement necessitates a holistic approach.

The role of surgical technique

Variation in surgical techniques introduces an additional layer of complexity to an already intricate scenario. A pivotal systematic review in the *International Urogynecology Journal* in 2018, titled "Anterior colporrhaphy: a standard operation? Systematic review of the technical aspects of a common procedure in randomized controlled trials" delved into the technical aspects of the procedure in randomized controlled trials (10). The findings emphasized the lack of a universally successful technique, highlighting the need for a more nuanced understanding of pelvic floor dynamics. As the article under consideration scrutinizes the impact of such variations on outcomes, it prompts us to reflect on the multifaceted nature of pelvic floor anatomy. Each patient presents a unique configuration of anatomical features, and the surgeon must navigate this dynamic landscape with a deep understanding of the underlying structures. The success of native tissue anterior POP repair is intricately linked to the surgeon's ability to grasp the anatomical intricacies and tailor the approach accordingly.

The article's exploration of the relationship between surgical technique variation and outcomes underlines the complexity of this field. In a discipline where evidence-based practices strive to provide a solid foundation, the outcomes are often influenced by factors beyond the reach of randomized controlled trials and statistical analyses. Various techniques are described and analysed in this article:

- Midline plication: this classic technique involves suturing the anterior vaginal wall midline to underlying structures. While it was historically foundational, its limitations in providing sustainable support had led to its reconsideration in contemporary practice. Midline plication primarily addresses the midline defect, while overlooking lateral or apical support also often involved, thus potentially leading to incomplete corrections and recurrent prolapse.
- Fascial flap repairs: variations in fascial flap repairs aim to reinforce the weakened anterior vaginal wall. Although some success has been reported, these techniques also fall short in addressing the multifactorial nature of anterior compartment prolapse.
- Deep or superficial fascial dissection: the depth of fascial dissection is a point of contention. While deeper dissection may enhance support, it also raises concerns about potential complications, such as nerve damage. Superficial dissection attempts to balance support and minimize risks but may be insufficient for severe cases.
- Type of sutures, number of fascial layers, and suture placement: the choice of sutures, the number of

fascial layers, and the placement of sutures are variables subject to the surgeon's appreciation, and no consensus exists on an optimal combination, contributing to the lack of standardization in anterior colporrhaphy.

Comparing these techniques, Fairclough *et al.* found contradictory results, between subjective and objective outcomes of various techniques. Two techniques (fascial flap repair and separate fascial defect repair) showed statistically significant outcome improvement, but both were performed by only one surgeon, and results maybe more due to the experience of the surgeon than to the technique itself, as will be discussed further in this article. Numerous potential biases exist in this article, and from my point of view it is impossible to draw any firm conclusions.

The role of tissue quality and healing capacity

Variability in tissue quality among patients can significantly impact the success of anterior POP repair. Factors such as compromised vascularity, scarring from previous surgeries, or inherent tissue weakness influence the healing capacity, making it challenging to achieve durable repairs. In this matter, genetic predisposition probably plays an important role (14,15). Each patient presents a unique combination of factors, such as tissue integrity, ligamentous support, and muscular strength. This variability makes it challenging to apply a one-size-fits-all approach in anterior POP repair.

Moving beyond defect repair, the reality of compensatory surgeries

The failures associated with anterior colporrhaphy highlight the need for a shift in perspective. Attempting to repair specific defects in the anterior vaginal wall may be an illusion in the face of the dynamic and interconnected nature of the pelvic floor. Compensating techniques prioritize apical support, aiming to prevent the development or recurrence of anterior compartment prolapse.

If apical prolapse is also present, as is often the case, sacrocolpopexy (SCP) has emerged as a compensating technique that addresses the shortcomings of traditional anterior colporrhaphy. By attaching the vaginal apex to the sacral promontory, SCP provides sturdy apical support, preventing the descent of pelvic organs. Lateral mesh suspension is another compensatory technique well adapted to anterior and apical concomitant defects. The resulting lifting of the vagina may compensate for both an associated apical and lateral defect.

However, while these abdominal (nowadays laparoscopic) compensatory techniques offer a promising shift in managing POP, challenges and controversies surround them. Critics argue that these approaches may be more invasive and carry their own set of risks. Additionally, concerns about long-term outcomes and comparative effectiveness persist, necessitating further research and scrutiny. Therefore, compensatory techniques demand a nuanced approach, making individualized interventions based on patient anatomy, preferences, and overall health crucial. Identifying criteria that predict success and tailoring the choice of technique to the patient's specific needs will be paramount in optimizing outcomes.

Defining recurrence: the precision predicament

The question of recurrence in anterior POP repair requires precision in definition for meaningful interpretation. The commonly accepted yardstick involves prolapse surpassing the hymeneal remnants, a benchmark that establishes clarity and consistency in evaluating outcomes. POP is a functional pathology. There is a large consensus nowadays that only symptomatic POP requires correction, which usually involves POP that extend beyond the plane of the hymen (16). This means that we must always put things into perspective when we talk about recurrence and that our surgical methods, either vaginal with native tissue repair or abdominal (laparoscopic) with mesh, although imperfect, are often enough to provide significant relief to patients. However, recurrences do exist and must be discussed with patients prior to surgery.

The surgeon's experience: an invaluable variable

While evidence-based guidelines lay the groundwork for best practices, the experienced surgeon goes beyond the confines of protocol. It is in the adaptation to the unique challenges presented by each patient that the art of medicine shines through. The human body, with its inherent complexities and variabilities, defies complete comprehension through scientific rigor alone. The surgeon's experience becomes the bridge that spans the gap between theory and practice, between textbook knowledge and the dynamic reality of the operating room.

While evidence-based practices provide a solid foundation, there are domains where science alone does not always offer definitive answers. Pelvic floor reconstructive

surgery illustrates this intersection of science and art. The surgical techniques, rooted in scientific understanding, are the tools that the surgeon wields. Yet, the patient's anatomy and the intricacy of their condition is dynamic and ever-changing.

However, leaving the technique up to the surgeons may put patients at risk if some surgeons believe they have more expertise than they do. Patients should seek second opinions before deciding on one or another procedure and find out about the surgeon's technical experience in the field. There is a fine balance to find between science and art and the maxim "primum non nocere" should always prevail.

Conclusions

The article from Fairclough *et al.*, outlines the complexities of native tissue anterior POP repair. The article's exploration of surgical technique variation prompts a deeper reflection on the multifaceted nature of pelvic floor reconstructive surgery. The complexity of pelvic floor anatomy demands ongoing exploration. The challenges embedded in pelvic floor reconstructive surgery, as highlighted by the article, underscore the limitations of a purely scientific approach. Our approach must for the moment remain pragmatic, centred on the interests of the patient, without aiming for perfect reconstruction, but at regaining functionality and comfort. As such, a simple anterior colporrhaphy, whatever the technique, even imperfect in its anatomical result, may suffice in selected cases of central defect. If the apical compartment is involved, or in the event of an associated lateral defect, compensatory rather than restorative surgery may be more appropriate. Laparoscopic abdominal routes with mesh such as SCP or lateral suspension may meet these conditions. However, vaginal apical suspension may also be sufficient in selected cases, reducing the risk of complex abdominal procedures. In this delicate balance between science and art, the surgeon's experience is probably of utmost importance.

Acknowledgments

Funding: None.

Footnote

Provenance and Peer Review: This article was commissioned by the editorial office, *Gynecology and Pelvic Medicine*. The article has undergone external peer review.

Peer Review File: Available at https://gpm.amegroups.com/article/view/10.21037/gpm-24-6/prf

Conflicts of Interest: The author has completed the ICMJE uniform disclosure form (available at https://gpm.amegroups.com/article/view/10.21037/gpm-24-6/coif). The author has no conflicts of interest to declare.

Ethical Statement: The author is accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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doi: 10.21037/gpm-24-6
Cite this article as: Dällenbach P. Anterior pelvic organ prolapse repair: the intersection of science and art. Gynecol Pelvic Med 2024;7:17.