

Article

The Role of a Multidisciplinary Approach in Gender Affirmation Surgery: What to Expect and Where Are We Currently?

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Abstract: Gender Affirmation Surgeries (GASs), erstwhile called Sex Reassignment Surgeries (SRSs), may be necessary for transgender individuals to change their bodily sexual characteristics and thereby affirm their gender identity. GASs encompass all medically necessary interventions to relieve gender dysphoria and should be available to patients who wish to, and who meet the surgical criteria of the World Professional Association for Transgender Health (WPATH) and Standards of Care (SOC). The comprehensive clinical assessment involves many health specialists, including general practitioners, psychologists, psychiatrists, speech therapists, endocrinologists, surgeons, anesthesiologists, nurses, and other healthcare professionals. To define the patients' complex care needs and their objectives, high-volume specialized centers, accredited training programs, skilled surgeons and health professionals specializing in transgender care within a multidisciplinary team are essential. Currently, the most prominent challenges are related to ethical issues such as the treatment of underage individuals, fertility, parenting and the potential for regret after GAS. Finally, although GAS has been practiced for more than half a century, data on long-term follow-up represents a further topic for investigation.

Keywords: gender dysphoria; gender non-conforming; transsexualism; gender identity; transgender; sex; sex reassignment surgery; gender affirmation surgery; reconstructive surgical procedures; multidisciplinary approach



Citation: Bocchino, A.C.; Cocci, A.; Zucchi, A.; Bartoletti, R.; De Lisa, A.; Morelli, G. The Role of a Multidisciplinary Approach in Gender Affirmation Surgery: What to Expect and Where Are We Currently? *Uro* **2022**, *2*, 179–190. <https://doi.org/10.3390/uro2030022>

Academic Editors: Bartosz Malkiewicz and Carlo Bettocchi

Received: 14 May 2022

Accepted: 20 August 2022

Published: 23 August 2022

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1. Introduction

For most people, gender identity and its expression are congruent with their sex assigned at birth. Conversely, in transsexual, transgender, and gender-nonconforming individuals, gender identity differs from their birth-assigned sex [1,2]. The terminology in this field is rapidly evolving, with the introduction of new terms and changes in existing definitions also depending on different cultures and backgrounds. In order to ensure that concepts are comprehensible in most contexts, WPATH provides a comprehensive glossary with definitions that have been used over time; some of these are summarized in Table 1 [1,2].

Gender Affirmation Surgeries (GASs), formerly called Sex Reassignment Surgeries (SRSs) may be necessary for these patients to physically change sexual traits to affirm their gender identity [2].

Although not all transgender people choose to undergo GASs, these are the last and irreversible standard-of-care interventions that may alleviate the physical and emotional distress due to gender dysphoria [1,2].

Table 1. Glossary and definitions [1].

Glossary	Definition
Sex	Sex assigned at birth as male or female, usually based on the appearance of the external genitalia or, in case of ambiguity, other components of sex (internal genitalia, chromosomal and hormonal sex).
Gender identity	The intrinsic feeling of being male, female or an alternative gender.
Gender-nonconforming	Individuals whose gender identity, role or expression differs from what is normative for their assigned sex within a given culture and historical period.
Gender dysphoria	Persistent and debilitating distress due to a discrepancy between a person's gender identity and sex assigned at birth.
Gender expression	Personality features, appearance, and behavior that in a given culture and historical period are considered as masculine, feminine or alternative gender roles such as genderqueer or specifically transgender individual.
Genderqueer	A person whose gender identity and/or role does not fit within a binary gender definition (man/woman, or male/female).
Transgender	An individual who transcends culturally defined gender categories and whose gender identity differs somehow from the sex assigned at birth.
Transsexual	A medical adjective that refers to people who seek to change or who have changed primary and/or secondary sex characteristics through feminizing or masculinizing hormones and/or surgery.
Transition	The period in which a person with gender dysphoria changes from the gender role associated with their sex to a different gender role.
Gender Affirmation Surgeries (GASs)	All surgical procedures that aim to change primary and/or secondary sex characteristics to affirm gender identity and alleviate gender dysphoria as a result.
Male-to-Female (MtF)	Individual assigned male at birth who is changing or who has changed their body and/or gender role to a more feminine body or role.
Female-to-Male (FtM)	Individual assigned female at birth who is changing or who has changed their body and/or gender role to a more masculine body or role.

The process that can help someone to relieve gender dysphoria can be very different for each individual; thus, surgical procedures are tailored according to the individual's transition goals (Table 2) [1].

Table 2. Overview of available surgical procedures for the treatment of gender dysphoria [1].

Male-to-Female (MtF) Patient	BREAST/CHEST SURGERY: Implants/lipofilling for augmentation mammoplasty.
	GENITAL SURGERY: Orchiectomy, penectomy, vaginoplasty, clitoroplasty, vulvoplasty.
	NON-GENITAL, NON-BREAST SURGICAL INTERVENTIONS: Facial feminization surgery, liposuction, lipofilling, voice surgery, thyroid cartilage reduction, gluteal augmentation (implants/lipofilling), hair reconstruction, and other aesthetic procedures.
Female-to-Male (FtM) Patient	BREAST/CHEST SURGERY: Subcutaneous mastectomy/creation of a flat chest.
	GENITAL SURGERY: Vaginectomy, hysterectomy/salpingo-oophorectomy, reconstruction of the fixed part of the urethra (potentially combined with a metoidioplasty or phalloplasty, scrotoplasty), implantation of erection and testicular prostheses.
	NON-GENITAL, NON-BREAST SURGICAL INTERVENTIONS: Liposuction, lipofilling or pectoral implants, voice surgery, and others aesthetic procedures.

Against this challenging background, a multidisciplinary team is crucial for defining the patients' complex care needs and their objectives.

Consequently, the comprehensive clinical assessment of gender dysphoria involves many specialists, including general practitioners, psychologists, psychiatrists, speech therapists, endocrinologists, surgeons, anesthesiologists, nurses, and other healthcare professionals.

Over the past several years, transgender healthcare has been resurgent in academic medical centers with the provision of GASs in high-volume multidisciplinary settings.

This paper aims to offer an overview of the different disciplines involved within a multidisciplinary approach to GAS, focusing mainly on specialists engaged in surgical and peri-operative management.

2. The World Professional Association for Transgender Health (WPATH) and Standards of Care (SOC)

The WPATH (World Professional Association for Transgender Health) is an international multidisciplinary association of professionals whose purpose is to promote transgender people's health, assistance and treatment based on medical evidence, training, research, advocacy, and respect [1].

Nowadays, healthcare providers worldwide refer to published recommendations issued by WPATH, even though the adherence to these recommendations is not legally binding [1,3].

Through the seven versions of the Standards of Care (SOC) for the Health of Transsexual, Transgender, and non-Conform People, the WPATH aims to initiate a process of de-pathologizing in order to encourage respect and fairness towards all gender and sexual diversity by abolishing all forms of prejudice and discrimination [1].

The SOC are based on the best available scientific knowledge and multidisciplinary expert professional consensus. The purpose is to offer clinical guidance to assist transsexual, transgender, and gender-nonconforming people through safe and effective pathways to achieve lasting personal comfort with their gender, and to maximize their overall health and psychological wellbeing [1].

Although the SOC are intended for global use, the WPATH is aware that most of the clinical experience and knowledge on the topic comes from North American and Western European data [1]. However, differences exist between countries in terms of social attitudes, gender roles and identities, access to care, social stigma, and political issues [1,4].

It is, therefore, not possible for the SOC to reflect all the differences and apply these standards uniformly in other cultural contexts; health professionals must consider these critical issues and adapt to local realities [1].

3. Relationship of Surgeons with Mental Healthcare Professionals, Hormone-Prescribing Physicians and Patients

GASs may include any surgical procedure that reconciles the body with the gender identity of the patient, including a broad spectrum of procedures summarized in Table 2 [1,3].

The WPATH SOC guides healthcare professionals when determining an individual's eligibility for GAS and aims to provide a flexible model that can be adapted to meet to the needs of the patient [1].

Importantly, not all transgender patients want to undergo surgery [3].

Surgical candidates must have persistent, invalidating and well-documented gender dysphoria, as well as well-controlled comorbidities; they must also be of a minimum age and capable of providing fully informed consent [1].

When considering gender surgery, it is required that the patient has spent 12 months living continuously in a gender role congruent with their gender identity and/or 12 continuous months of hormone therapy prescribed by an endocrinologist according to the patient's gender targets (Tables 3 and 4) [1].

Table 3. Criteria for breast/chest surgery (one referral) [1].

Criteria for Mastectomy and Creation of a Male Chest in FtM Patients
Persistent, well-documented gender dysphoria
Capacity to provide fully informed consent for treatment
Age of majority in a given country
If significant medical or mental health concerns are present, they must be reasonably well managed
Hormone therapy is not a prerequisite
Criteria for Breast Augmentation (Implants/Lipofilling) in MtF Patients
Persistent, well-documented gender dysphoria
Capacity to make a fully informed decision and provide consent
Age of majority in a given country
If significant medical or mental health concerns are present, they must be reasonably well managed
Although not an explicit criterion, a minimum of 12 months of feminizing hormone therapy is recommended to maximize breast growth and improve aesthetic surgical outcomes

Table 4. Criteria for genital surgery (two referrals) [1].

Criteria for Mastectomy and Creation of a Male Chest in FtM Patients
Persistent, well-documented gender dysphoria
Capacity to provide fully informed consent
Age of majority in a given country
If significant medical or mental health concerns are present, they must be reasonably well managed
Twelve continuous months of hormone therapy as appropriate to the patient's gender goals (unless hormones are not clinically indicated for the individual)
Criteria for Breast Augmentation (Implants/Lipofilling) in MtF Patients
Persistent, well-documented gender dysphoria
Capacity to provide fully informed consent
Age of majority in a given country
If significant medical or mental health concerns are present, they must be reasonably well managed
Twelve continuous months of hormone therapy as appropriate to the patient's gender goals (unless hormones are not clinically indicated for the individual)
Twelve continuous months of living in a gender role congruent with gender identity

This 12-month time criterion should enable an appropriate range of different life moments to be tested, so that patients can successfully experience and function day by day and across all settings in their gender role (e.g., personal and family events, holidays, work or educational situations) [1].

Surgical treatments for gender dysphoria can only be undertaken following a recommendation from a qualified mental health professional. One referral is needed for breast/chest surgery, whereas two referrals are required for genital surgery. The mental healthcare specialist must provide documentation related to the patient's personal and therapeutic history, progress, and surgical eligibility [1] (Tables 3 and 4).

The WPATH SOC does not set out explicit criteria for other feminizing or masculinizing surgical procedures; however, a mental health professional may be important for counseling in relation to these surgeries.

Since hormonal feminizing or masculinizing therapy affects fertility, mental health professionals, hormone-prescribing physicians, and surgeons should discuss reproductive options with patients before proceeding with medical treatments and surgeries for gender dysphoria [1,5,6]. These issues must be addressed even if patients are not interested in them at the time of treatment because there are documented cases of individuals who received hormone therapy and genital surgery, and who later regretted the inability to become parents of genetically related children [1,7,8]. Patients should be informed that these techniques are not available everywhere and can be relatively expensive [1].

Special consideration should be given to transgender teens due to their particular reproductive healthcare needs [1,9]. Indeed, prepubescent or pubertal teenagers will never develop reproductive function of their sex assigned at birth because of blockers or cross-gender hormones, and no technique exists to preserve the gonad of these individuals [1]. Consequently, the detrimental impact of medical and surgical transition on the fertility potential of a young person is an extremely important concept that young patients and their parents both need to understand with the support of multidisciplinary healthcare team [1,9].

Finally, the WPATH recommends qualified surgeons with a comprehensive knowledge of all the potential surgeries and other peri-operative considerations specific to transgender patients [1].

GAS is the last step of the potential treatment process for gender dysphoria. While many transsexual, transgender, and gender-nonconforming individuals find solace in their role, expression, and gender identity without surgery, for others surgery is a necessary medical treatment to alleviate their gender dysphoria [1,10]. For these patients the change in their primary and/or secondary sexual characteristics establishes a higher concordance with their gender identity and promotes their subjective well-being and inclusion in their social setting [1].

The team of qualified surgeons engaged in GASs includes urologists, gynecologists, maxillofacial surgeons, otolaryngologists, plastic surgeons or general surgeons with additional specialized training in breast/chest and genital reconstruction.

These different surgeons must collaborate throughout the individual's transition process.

It should be noted that the role of a surgeon in treating gender dysphoria is not that of a mere technician [1]. Conversely, surgeons should have insight into the patient's history and the rationale for the referral to a surgical procedure. This requires surgeons to speak extensively with the patient and to maintain close collaboration with other health care professionals actively involved in a multidisciplinary team [1].

Once the patient meets the GASs criteria (as outlined above), a pre-operative surgical consultation should be conducted [1].

The process of providing informed consent to surgery should be extensively discussed with the patient, with discussion of the individual's aims and expectations, pre- and post-operative courses and the potential risks and outcomes related to the surgery [1].

Specifically, it is the responsibility of surgeons to discuss:

- the different surgical techniques available and to provide the most tailored surgery for the patient (in consultation with colleagues who are well experienced with different techniques);
- the benefits and drawbacks of each technique;
- the limits of a procedure to achieve "imaginary" outcomes, ensuring that patients have realistic expectations;
- the goal of surgery is to achieve good aesthetic and functional outcomes, but each anatomy is different and the results of surgery vary from person to person;
- risks and potential complications that may include bleeding or hemorrhage (with the potential need for transfusions), hematoma, seroma, wound infection or abscess, wound healing issues, injury to surrounding organs, venous thromboembolism and cardiopulmonary complications [1].

This information must be provided to patients in writing in appropriate language and with imaging illustrations [1].

Since most surgeries are irreversible, care should be taken to ensure that patients have sufficient time enough to fully understand the information before providing written informed consent [1].

In addition, after the surgery, the surgeons should provide immediate aftercare and consultations with other physicians who will assist the patient [1].

Finally, the active engagement of the patient with their surgeon is also critical to the development of appropriate post-operative care.

4. Anaesthetic Considerations and Implications

While the roles of hormone-prescribing physicians, surgeons and mental health professionals are outlined in the WPATH SOC, that of anesthesiologists is not addressed.

Due to the scarcity of related literature, anesthesiologists are at a disadvantage, but these specialists are critical to the multidisciplinary team for pre-operative assessment, as well as for the management during surgery and post-operative pain [11].

Anesthesiologists should acquire the expertise needed to manage these patients inclusively and respectfully and be aware of their unique physiological and psychosocial needs [12].

The pre-operative consultation includes a detailed history, focusing on the patient's hormonal treatment and its effect in the peri-operative period and on related medical conditions [11,12].

GAS forces anesthesiologists to look for more effective protocols of anesthesia in order to enhance the prognosis and minimize morbidity [11].

During the physical examination, it is important to consider any feminizing and masculinizing procedures (e.g., genioplasty, thyroid cartilage augmentation) because these interventions alter the anatomy, and lead to potentially difficult airway management and complications (especially for vocal feminization) [12].

Laboratory results should be interpreted with endocrinologists because hormonal therapy could influence the reference values, and the normal range is often calculated based on biological sex [12,13]. Therefore, it is necessary to consider the physiology underlying each test and whether the male or female range is more suitable [12]. Additionally, required laboratory tests based on biological sex are prostate specific antigen [PSA] for transgender females, and human chorionic gonadotropin (hCG) for transgender males with intact female reproductive organs to exclude the possibility of pregnancy [13–15].

Moreover, considering that HIV prevalence is elevated among transgender populations, pre-operative testing should be conducted accordingly [16].

In addition, risk assessment tools should be used with caution, since they often include sex in the scoring systems but do not account for the use of hormone therapy in this at-risk population [12].

Venous thromboembolisms (VTE), such as deep venous thrombosis and pulmonary embolism, are the main peri-operative concerns for transsexual patients [13]. These hematological complications are associated with prolonged immobility during surgery and the thrombotic effects of hormone therapy that place this population of patients at increased risk [13].

Rates of VTE in the literature for transgender women on estrogen therapy for testosterone suppression range from 0% to 6% [13,17,18]. Protocols on the use of estrogen in transgender women should consider additional VTE risk factors such as smoking, hypercoagulable disorders and cancer diagnosis [13,17]. Therefore, intra-operative VTE prophylaxis with subcutaneous heparin and sequential compression devices are mandatory [13,19].

Further intra-operative considerations include drug dosing and drug interactions that are commonly encountered in transgender patients [12].

Lastly, management of post-operative pain following GAS is challenging. A multi-modal approach that includes regional blocks and a focus on pre-existing chronic pain conditions should be used in the post-operative pain management plan [12].

The risk of post-operative nausea and vomiting, which requires appropriate antiemetic prophylaxis, has not yet been established among this population [12].

5. Nursing Management

Nursing management is also crucial in a multidisciplinary team, although it is not discussed at length in the WPATH SOC and is little discussed in literature.

Registered nurses play a critical role in gender-affirming care by optimizing psychosocial, hormonal, and surgical gender-affirming care through comprehensive assessments, coordinating care, and by providing education and health coaching [20].

As indicated by the American Nurses Association (ANA) in their position statement for gender non-conforming populations, nurses are embedded throughout the continuum of care, promoting and providing culturally congruent, competent, safe, and ethical care [21].

Moreover, recent studies on nursing students, showed the importance of specific training scenarios to practice therapeutic communication, which increase the confidence and comfort of transgender patients during their care [22–24].

The nursing staff must create an environment of acceptance, support, empathy, and trust that includes at first addressing the patients with the appropriate forms of names and pronouns.

To further improve the patient-nurse relationship and avoid the risk of stigmatization, patients should be received and visited without judgment, including those patients who are positive about their appearance.

During the pre-operative nursing evaluation, it is also important to be aware of changes in primary and secondary sexual characteristics related to hormone therapy and any previous surgery.

The patient's emotional state must also be supported with coping strategies, thereby strengthening the patient's ability to influence results.

In the operating room, the nursing staff monitors the potential injury factors (e.g., surgical positioning, surgery equipment and environmental risks) and protects the patient's dignity and interests during anesthesia, with responsibility for maintaining high surgical standards of care.

During surgery, nursing responsibilities include ensuring the patient's safety and well-being, coordinating operating room personnel, and performing scrub nurse roles.

GAS patients face a high risk of skin decubitus and/or thrombotic events, so the operating room staff also play an essential role in use of anti-bedsore devices in critical areas (e.g., thighs, legs, lumbar area and shoulder blades) and devices to help the venous return from the lower limbs.

Another responsibility not to be underestimated by nursing staff is the question of room assignments because transgender patients should be roomed in accordance with their gender identity. If the medical record is unable to accommodate sex and gender as distinct values, careful communication is needed to ensure that staff caring for the patient are aware of the discrepancy [13]. Including the patient in room allocation discussions as soon as possible will help prevent issues before they arise [13].

Where a private room is available, it should be optional as increased privacy may provide additional comfort and/or safety to the patient but it should not be a mandated choice if the patient has feelings of isolation [13,25].

Transgender patients may incite undesired curiosity among peri-operative staff, due to a relative lack of expertise, so it is critical to preserve their privacy and dignity and avoid unfounded concerns and affronts [13].

Finally, during the delicate post-operative period, nurses are responsible for the management of the bladder catheter, administration of prescribed therapies, surgical wound dressing, handling hygiene and support of the patient.

6. Bioethical Questions

All physicians involved in treating gender dysphoria face major bioethical challenges, and a multidisciplinary approach is needed, although it may not always ensure success [26].

The pillars of the ethical principles are autonomy (giving the patient the freedom to choose freely), beneficence (doing good), nonmaleficence (to do no harm), justice (ensuring fairness) [26].

Patients must have autonomy of thought and intent in decision-making about medical treatment, if they are capable [26]. This is a particularly sensitive area in the treatment of gender dysphoria since sometimes the desires, hopes and expectations of the individual may not correspond to reality [26]. The multidisciplinary team needs to be very direct about specific possibilities, the benefits and the drawbacks of treatment, especially since the last stage of transition, GAS, is mostly irreversible [26].

Beneficence implies doing only good, only what is in the patient's best interest; thus, in ordinary surgical practice, pathological tissues are removed prevent impairment, or changes are made to bodily characteristics to enhance the patient's self-image [1,26]. However, some people are opposed to GAS for ethical reasons because it does not comply with this principle [1,26].

Nonmaleficence must ensure that the treatment it is not harmful for the individual in term of emotional, social, or physical condition [26].

It is critical that healthcare professionals treating patients with gender dysphoria feel comfortable modifying anatomically normal structures [1]. To understand how surgery can relieve the psychological discomfort and distress of gender dysphoria, professionals need to listen to these patients regarding their symptoms, feelings, and personal stories [1]. The resistance to performing surgery on the ethical basis of "above all do no harm" should be respected and discussed with the opportunity to learn from patients themselves about the gender dysphoria's psychological distress and the potential for harm caused by refusing access to GAS [1].

Furthermore, with rapid developments and recent achievements in this field, new intricate challenges in medical and surgical management have emerged [26].

The most recent difficult issues related to gender dysphoria are the treatment of youth, fertility, parenting, and the risk of regret following the irreversible GASs [26].

6.1. Gender Dysphoria in Youth

Children account for a small number of patients with gender dysphoria and 10% to 20% will continue to experience gender dysphoria into adolescence [26,27]. Psychological counseling is strongly recommended because inadequate management of gender dysphoria in children and adolescents can lead to severe consequences from isolation and feelings of self-hatred up to self-harm and suicide [26].

According to bioethical principles, the law generally forbids children from decision making in relation to cross-hormonal therapy [26]. In spite of that, cross-sex therapy is primarily useful in patients with gender dysphoria to align the phenotypic appearance with the gender identity [26]. According to WPATH SOC, the access to hormone therapy requires adequate mental faculties to provide consent for this potentially irreversible treatment. Based on the Endocrine Society guidelines, most adolescents develop this capability by the age of 16, although relatively few studies have investigated the impact of cross-sex hormonal therapy on gender dysphoria in youth [28]. Under the principle of beneficence, clinicians are always required to help the patient, and if treatment is requested and refused, some patients may face serious consequences [26]. Despite this, in conformity with WPATH SOC, the eligibility for GAS requires the patient to be of legal age in their particular country, and generally, the cut-off may be assumed to be 18 years. With the widespread use of puberty blockers and pressure to decrease the age threshold for the start of the cross-sex hormone therapy, it was only a matter of time before the issue of GAS in minors arose [26]. Allowing hormonal therapy without having access to GAS, increases the gap between the two medical processes, with delays on the aimed outcome and a potential detrimental

impact on their social, sentimental, and psychological background [26]. Conversely, the main surgical issue for children treated with puberty blockers is their undeveloped genitals. Thus, GAS is more challenging, notably for vaginoplasty, with the need for autologous skin grafting from a donor site or use of bowel segments [26,29,30].

However, the gravest concern is the potential for regret after GAS, especially considering gender dysphoria does not persist through adolescence in the most children [26].

Further investigation is needed to resolve these critical concerns and the involvement of a multidisciplinary team remains a cornerstone in this regard.

6.2. Regret after GAS

Regret after GAS may be expressed as dissatisfaction and reconsideration [26].

The most serious form of regret after GAS arises when the patient addresses surgeons with the request for restitution of the anatomy assigned at birth [26]. After suicide, regret may be considered as one of the most serious complications of GAS [26].

The grounds of regret vary considerably: social exclusion, co-morbidity with psychiatric disorders, inadequate psychological and psychiatric assessment, and dissatisfaction with the aesthetic or functional outcomes of GAS [26]. Certain other factors may be associated with a risk of regret: age above 30 years at first surgery, personality disorders, social instability, unsatisfactory surgical outcomes, and poor support from partner or family [26,31–33].

Every occurrence of regret represents a major issue for any specialist in a multidisciplinary team [26]. To prevent the intricate matter of regret, proper diagnosis during pre-operative evaluation by trained professionals, psychologists and psychiatrists is imperative in conjunction with further research and studies [26].

6.3. Fertility and Parenting

Treatment of gender dysphoria affects the fertility of individuals but it should be considered that these patients may have the desire for offspring after transition, especially as patients are generally of reproductive age at the beginning of their transition.

In the literature, several authors have reported transgender people wanting to have children and found that about half of patients with gender dysphoria wanted offspring after transition [26]. For this reason, WPATH SOC and the Endocrine Society stress the importance of counseling that includes a comprehensive explanation about the consequences of treatments and of the viable options for fertility preservation.

GASs can entail orchiectomy in MtF patients and hysterectomy and oophorectomy in FtM patients, causing irreversible infertility.

Cross-sex hormonal therapy impacts fertility and puberty blockers are thought to be a reversible component of the transition, preventing the development of secondary sexual traits [26]. Nevertheless, some authors acknowledge that these blockers also have an impact on the maturation of germ cells that could be employed for cryopreservation prior to the start of hormonal therapy [26,34]. Once hormonal transition has already begun, some authors suggest a disruption of hormonal treatment for at least 3 months with the aim of reverting any induced effect [35]. This may lead to another issue since other physicians reported that most patients refused to delay their transition for these procedures [26]. It should not be understated that other questions can also cause distress because of potential unwanted reminders of assigned sex at birth; for example, a transvaginal ultrasound is a required step for cryopreservation of embryos, oocytes or ovarian tissue but is not always in accordance with FtM gender identity. Likewise, sperm cryopreservation by masturbating, or surgical sperm extraction, and testicular tissue for MtF patients may also cause distress [26].

Moreover, for youth patients, there are other issues including the maturity to make these kinds of decisions and the legal responsibility of their parents [8,26,36].

It is also necessary to keep in mind that in some countries, cryopreservation is unavailable to transgender patients [26].

Considering pregnancy in FtM patients, in certain countries such as the U.S., sterilization is not obligatory, which allows the preservation of the ovaries and uterus for later pregnancy (with temporary discontinuation of hormonal therapy) [27,37].

Conversely, pregnancy is still not an option for MtF patients, but there is hope ahead due to the first live birth following a successful uterus transplantation (UTx) and subsequent cases reported around the world [26,38]. It is a solution for every woman with absolute uterine infertility who wants to carry her own children, but this surgery opens new horizons for researchers, making UTx an option also for trans-women [26]. In addition to bioethical issues, the main clinical challenges may come from the different anatomy of the male pelvis, as well as from immunosuppressive drugs [26]. Additional research is obviously necessary in this innovative field, which will require further increased efforts for multidisciplinary patient management.

7. Follow-Up after GAS

The involvement of a multidisciplinary team is also of the highest priority in the long-term follow-up. Although GAS has been practiced for more than half a century, outcome data about morbidity, mortality, and the well-being of individuals after GAS are of low quality and equivocal, especially with regard to long-term follow-up [39,40].

Although the nature of GAS precludes randomized controlled double-blind studies, and many patients decline to participate in follow-up studies, resulting in high drop-out rates or limited data, some reports have suggested higher rates of overall mortality, death from cardiovascular disease and suicide or suicide attempts, and psychiatric hospitalization compared with the general population [39]. Subsequent evidence reported in a meta-analysis of twenty-nine studies, mainly cross-sectional, suggests that transgender people have a lower quality of life than the general population [41].

In contrast, a recent meta-analysis of seventy-nine low quality studies reported that most transgender patients are satisfied with surgical outcomes when assessed during at least one-year of follow-up, with patients reporting positive psychological and sexual wellbeing post-surgery and similar wellbeing outcomes to those who have not had surgery both for transgender women and men [42]. Better quality studies that include clearly defined transgender populations, divided by stage of gender affirming treatment and with appropriate matched control groups are needed to draw firmer conclusions [41].

8. Conclusions

Gender affirmation surgery is a medically necessary intervention for gender dysphoria and should be offered to patients who desire it and meet the WPATH SOC criteria for surgery. Most knowledge in this field comes from North American and Western European data; thus, adaptations of the SOC to specific nations are mandatory. (1) GAS is not a mere set of surgical procedures but concerns a lengthy and complicated process involving the active collaboration of multiple disciplines including primary care, psychology, psychiatry, plastic surgery, endocrinology, otolaryngology, urology, gynaecology, maxillofacial surgery, anaesthesiology and nursing [11].

With the evolution of GAS, there will be an increasing need for specialized centers, certified training programs, qualified surgeons and health professionals skilled in transgender care within a multidisciplinary team.

Currently, the most prominent challenges pertain to ethical issues such as the treatment of underage individuals, fertility, parenting, the possibility of regret after GAS as well as the need for high quality studies on long-term follow-up [26].

Author Contributions: Conceptualization, A.C.B.; writing—original draft, A.C.B. and A.C.; writing—review and editing, A.C.B., A.C., A.Z., R.B. and A.D.L.; Project administration, G.M. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: Not applicable.

Conflicts of Interest: The authors declare no conflict of interest.

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