Supplemental Digital Appendix 1
Clinical Services Performed at the Johns Hopkins Center for Transgender Health, December 2021

Top Surgery (Breast Augmentation/Mastectomy)

By volume, the most commonly performed surgeries are breast augmentation and gender-affirming bilateral mastectomy. The materials required to successfully perform these procedures are typically available at any institution that routinely performs breast reconstruction/augmentation with the addition of a few extra instruments. Our center typically performs these on an outpatient basis.

Genitourinary Reconstruction (Phalloplasty/Metoidioplasty/Vaginoplasty)

Our approach to genitourinary procedures involves integrated surgical teams that consider the goals and future surgical plans of the patient. While it depends on the surgical plans of the patient, hysterectomy is generally done prior to phalloplasty by a gynecologist who customizes the approach to allow patients to have optimal long term outcomes with phalloplasty. Orchiectomy is generally performed by a urologist, either in lieu of or as a precursor to vaginoplasty. Vaginectomy is done during phalloplasty staging by the urologist on the surgical team. The integrated approach to surgical care improves outcomes for patients and fosters positive interactions with one unified team.

Additionally, ERAS pathways were developed to optimize adequate pain control, mobility, and discharge planning. Nursing staff were trained and updated every few months to account for staff turnover. Success following vaginoplasty is heavily dependent on diligent post-operative care and adherence to dilation instructions. Patients are provided with a set of medical grade dilators and prior to discharge are taught how to perform dilation. Phalloplasty and vaginoplasty patients require post-operative visits as often as weekly. All post-op appointments for the first six months

were made before hospital discharge. Given that many GAS patients travel from out of state, advanced scheduling is required to ensure patients return for follow-up.

We also pursued the creation of new protocols such as specialized CT scans that factored in the more complex urethral anatomy of a post-operative phalloplasty patient. Traditional methods to assess urinary anatomy including retrograde urethrograms (RUG) gave poor visualization and required the presence of a provider which made scheduling difficult. We developed a novel 3D CT voiding urethrogram (3DUG) protocol to better evaluate the anatomy of a neo-urethra while also not requiring a provider presence.

Facial Gender Surgery

Facial gender surgery requires both specialty expertise and careful pre-operative planning to provide the service effectively. We use virtual surgical planning, as there is a growing body of evidence to support its effectiveness in improving facial gender surgery results.16,17 3D images, anatomical models, and custom printed cutting guides, plates, and implants are planned. FGS cases are the most challenging from an OR logistics standpoint because a) they often involve different permutations of facial procedures, making it harder for staff to anticipate; b) they involve a wide variety of complicated equipment. Dedicated staff familiar with specific burs and drills allowed seamless transitions between different equipment required for complicated cases. Open communication with anesthesia to discuss airway options allowed for a timely intubation and/or intraoperative exchange of nasal tube to oral tube if necessary.

Anesthesia

The anesthesia department has over 200 attending faculty members, for whom in person training sessions were conducted. A faculty member was identified as the CTH Anesthesia Director to liaise and develop optimized protocols. In order to develop and maintain anesthesia-provider

quality control in the oversight of cases, a small group of 5 attendings and 7 CRNAs were formed based on those who showed extra interest in working with the TGD population; this cohort grew as surgical volume increased. At four-week intervals, the CTH anesthesia director coordinated with the CTH scheduling office to plan out case times and then request members of the anesthesia cohort to be assigned to the case.

A 'soft' opt-out option existed for those not comfortable participating in gender affirming surgery, primarily to protect the patients from exposure to a healthcare provider that could potentially be culturally insensitive. However, regardless of personal beliefs, all anesthesiologists were required to participate in cases of emergency or when staffing required. Less than 1% of providers declined to participate, typically because of religiosity.

Voice Therapy

Gender affirming voice care is provided by partnered laryngologists and speech and language pathologists. Patients receive an initial evaluation where the patient is scoped to look for nodules or other irregularities that can alter pitch. A speech therapist then works with the individual to identify beneficial exercises to change pitch, tone, and cadence. Insurance is pre-authorized beforehand to ensure coverage and if insurance does not cover this service, a pro bono telephone call was placed to the patient to reinforce exercises. In a minority of cases, where repeated therapy lessons were ineffective at significantly changing the voice, vocal surgery was performed.

Fertility Preservation

Through a partnership with the Department of Obstetrics and Gynecology's fertility center, patients are provided options for fertility preservation. Egg freezing, embryo freezing, ovarian tissue freezing/reimplantation, and sperm freezing are available through consultations with

providers in Ob/Gyn and reproductive endocrinology. Currently, we have seen no insurance coverage for these services so utilization has remained low compared with other services.