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Gender Dysphoria

Gender dysphoria is the psychological distress experienced by individuals whose gender identity differs from the sex assigned at birth. It is not a matter of preference or rebellion against gender norms, but a profound incongruence that can result in significant emotional, psychological, and even physical suffering. In medical and psychiatric frameworks, this condition is carefully distinguished from gender nonconformity, which simply refers to behavior or appearance that doesn't match societal expectations of gender. Gender dysphoria specifically involves persistent distress that interferes with daily functioning and personal well-being.

Over time, understanding of gender dysphoria has evolved in both clinical settings and public discourse. The traditional binary of male and female has given way to a recognition of gender as a spectrum. This shift has opened up a broader lens through which to examine the experiences of transgender and gender-diverse individuals. With greater social visibility has come increased access to gender-affirming care and more nuanced therapeutic options, particularly for adolescents and young adults.

The growing demand for gender-affirming treatments has revealed a complex clinical landscape. In pediatric cases, early diagnosis and intervention can be crucial, especially during puberty, when physical changes may exacerbate distress. Pubertal suppression using GnRH analogues has become a common intervention. This treatment halts the development of secondary sex characteristics, giving young people time to explore their gender identity without the added burden of unwanted physical changes. It is often followed by cross-sex hormone therapy to induce the characteristics of the affirmed gender.

Despite its utility, pubertal suppression is not without controversy. Supporters view it as a compassionate and effective way to mitigate psychological suffering and reduce the need for future surgeries. Opponents raise concerns about the long-term impact on brain development, fertility, and psychological maturity. There is also debate over the adequacy of informed consent, particularly in cases involving minors.

Surgical interventions—commonly referred to as gender-affirming surgeries—represent another dimension of care for individuals with gender dysphoria. These procedures may involve chest reconstruction, genital surgeries, or facial feminization/masculinization. The decision to undergo surgery is deeply personal and typically follows an extended period of psychological and medical evaluation. While not all individuals with gender dysphoria pursue surgery, for many, these interventions offer a significant reduction in distress and a path toward alignment between body and identity.

Long-term outcome data on gender-affirming surgery remain limited but are growing. The available evidence indicates sustained improvements in mental health, self-image, and quality of life. A 40-year follow-up study of individuals who underwent such surgeries showed high satisfaction rates, improved body congruence, and significantly reduced levels of psychological comorbidity, including depression and suicidal ideation. Importantly, there were no reported regrets among participants, challenging the narrative that these procedures are frequently regretted or reversed.

Still, a portion of individuals who transition later choose to detransition. This does not necessarily invalidate gender-affirming care but does highlight the need for comprehensive psychological assessments and long-term follow-up. Reasons for detransition vary widely—from dissatisfaction with medical outcomes, to shifts in identity, to external pressures such as social rejection. Some individuals also report that their gender dysphoria was initially misattributed and later recognized as a symptom of trauma, mental illness, or internalized homophobia. These cases underscore the importance of differentiating gender dysphoria from other psychological conditions and ensuring that interventions are tailored to each individual's specific needs.

The concept of gender fluidity adds another layer to the discourse. Increasingly, people identify outside of the male/female binary—describing themselves as nonbinary, genderqueer, genderfluid, or agender. These identities challenge the medical model that often presumes a clear destination in gender transition. For some, partial transition—such as hormone therapy without surgery—provides enough relief from dysphoria. For others, social transition alone is sufficient. This variability in treatment paths reinforces the need for an individualized, patient-centered approach.

Multidisciplinary care is now widely recognized as the gold standard in managing gender dysphoria. Optimal outcomes are achieved when mental health professionals, endocrinologists, surgeons, and primary care providers collaborate closely. This team-based approach helps ensure that medical interventions are clinically appropriate and aligned with the patient's goals. It also provides a support network that can address the psychosocial challenges many individuals face during transition.

Pediatric care presents its own set of challenges. Prevalence of gender dysphoria in children and adolescents appears to be rising, driven in part by greater awareness and social acceptance. At the same time, questions remain about how to distinguish between transient gender exploration and persistent dysphoria. Some children who exhibit gender nonconformity in early childhood do not go on to experience dysphoria in adolescence or adulthood. For this reason, current best practices emphasize careful monitoring and gradual intervention, reserving medical treatments for those with clearly established and enduring dysphoria.

The evolving understanding of gender identity has also reshaped diagnostic criteria. The DSM-5 redefined gender dysphoria to focus on distress rather than identity per se, shifting away from pathologizing gender variance. The ICD-11 went even further, removing gender

incongruence from the mental health category altogether and reclassifying it under sexual health. These changes reflect a broader cultural and medical recognition that being transgender is not, in itself, a disorder.

This shift has practical implications. It reduces stigma, facilitates insurance coverage, and supports the legitimacy of gender-affirming care. At the same time, it requires healthcare systems to adapt—training providers, updating protocols, and expanding access to services. For pediatricians, who often serve as the first point of contact, this means taking on a more active role in coordinating care, educating families, and advocating for young patients.

In all this, consent and informed decision-making remain critical. Whether the patient is a minor or an adult, the decision to initiate treatment should be based on a thorough understanding of the risks, benefits, and alternatives. This includes consideration of how treatment may impact fertility, future sexual function, and mental health. For minors, parental involvement is usually essential, but care must also respect the autonomy and evolving capacity of the adolescent.

Ultimately, gender dysphoria is a deeply personal and often complex experience. There is no single narrative or treatment pathway that fits all individuals. For some, medical transition offers profound relief and an opportunity to live authentically. For others, non-medical strategies are sufficient. And for a few, the journey includes detransition and reflection. The common thread is the need for respectful, evidence-based, and flexible care that centers the experiences and goals of the individual.

As the field continues to grow, further research is essential. Long-term studies are needed to assess the safety and efficacy of current interventions, identify predictors of positive outcomes, and understand the experiences of detransitioners. Ethical questions about autonomy, consent, and the role of medicine in shaping identity must be openly discussed. In the meantime, providers must navigate these complexities with humility, compassion, and a commitment to helping each patient find their own path toward well-being.

References:

1- Hembree WC, Cohen-Kettenis PT, Gooren L, Hannema SE, Meyer WJ, Murad MH, Rosenthal SM, Safer JD, Tangpricha V, T'Sjoen GG: Endocrine Treatment of Gender-Dysphoric/Gender-Incongruent Persons: An Endocrine Society Clinical Practice Guideline. J Clin Endocrinol Metab. 102(11):3869-3903, 2017

2- Selvaggi G, Salgado CJ, Monstrey S, Djordevic M: Gender Affirmation Surgery. Biomed Res Int. 8 Jul 5;2018:1768414, 2018

3- Mahfouda S, Moore JK, Siafarikas A, Hewitt T, Ganti U, Lin A, Zepf FD: Gender-affirming hormones and surgery in transgender children and adolescents. Lancet Diabetes Endocrinol. 7(6):484-498, 2019

4- Claahsen-van der Grinten H, Verhaak C, Steensma T, Middelberg T, Roeffen J, Klink D: Gender incongruence and gender dysphoria in childhood and adolescence—current insights in diagnostics, management, and follow-up. Eur J Pediatr. 180(5):1349-1357, 2021

5- Littman L. Individuals Treated for Gender Dysphoria with Medical and/or Surgical Transition Who Subsequently Detransitioned: A Survey of 100 Detransitioners. Arch Sex Behav. 50(8):3353-3369 2021

6- Park RH, Liu YT, Samuel A, Gurganus M, Gampper TJ, Corbett ST, Shahane A, Stranix JT: Long-term Outcomes After Gender-Affirming Surgery: 40-Year Follow-up Study. Ann Plast Surg. 89(4):431-436, 2022

7- Micangeli G, Profeta G, Colloridi F, Pirro F, Tarani F, Ferraguti G, Spaziani M, Isidori AM, Menghi M, Fiore M, Tarani L: The role of the pediatrician in the management of the child and adolescent with gender dysphoria. Ital J Pediatr. 49(1):71, 2023

Adenocarcinoma of Intestine

Adenocarcinoma of the intestine in the pediatric population is an exceedingly rare malignancy, accounting for only a small fraction of childhood cancers and an even smaller proportion of gastrointestinal (GI) tract tumors in individuals under 18 years of age. Despite its rarity, it is a clinically important entity due to its aggressive course, delayed diagnosis, and poor prognosis compared to many other pediatric malignancies. Across multiple retrospective series and international registry analyses, the scarcity of cases has historically limited robust characterization, yet a growing body of literature—including large-scale, multicenter datasets—now provides valuable insight into its epidemiology, presentation, histopathologic features, treatment approaches, and prognostic factors.

Data from Korea represent one of the most comprehensive contemporary series, encompassing 80 pediatric patients diagnosed with adenocarcinoma between 1995 and 2016 from 10 hospitals nationwide. The median age at diagnosis was 15 years (range, 10–17), with a slight male predominance (46.3% male overall). Approximately 30% had either a family history of cancer or a predisposing underlying condition. The distribution of primary tumor sites was heavily weighted toward the gastrointestinal tract, with the colon and rectum being the most common location (40%), followed by the stomach (18.8%) and, far less frequently, the small bowel (1.3%). Non-GI primaries included ovarian (22.5%), lung, urinary bladder, and several other organs.

The Korean cohort revealed a striking pattern of late-stage diagnosis. Over half of all cases (54.8%) presented with stage III or IV disease at diagnosis, but this was more pronounced in GI tumors, where nearly 90% were advanced-stage compared to less than half of non-GI tumors. Symptom duration before diagnosis varied, but for GI primaries, abdominal pain, bowel obstruction, vomiting, and gastrointestinal bleeding were the most common initial complaints. In non-GI tumors, symptomatology reflected the involved organ or was discovered incidentally.

Treatment in children largely mirrors that in adults, relying on surgical resection for local disease control. In the Korean series, surgery was often complemented by chemotherapy, particularly in advanced-stage cases. Radiotherapy was rare and reserved for specific non-abdominal sites or metastatic palliation. Despite aggressive multimodal therapy, the outcomes for pediatric GI adenocarcinoma were distinctly worse than for non-GI adenocarcinoma. The five-year overall survival rate for GI tumors was only 44.7%, compared to 78.8% for non-GI adenocarcinoma. Among GI sites, colorectal primaries showed somewhat better survival than gastric or small bowel primaries, but even these lagged significantly behind non-GI outcomes.

One of the most robust prognostic markers identified in the Korean study was the pre-treatment carcinoembryonic antigen (CEA) level. Patients with CEA levels above 3 ng/mL

had a dismal five-year survival rate of only 23.8%, compared to 69.3% in those with normal CEA. This marker retained its prognostic significance in multivariate analyses, suggesting utility in both diagnosis and follow-up.

Findings from other international series support and broaden the Korean observations. Pediatric colorectal adenocarcinoma, while the most common GI site, still presents with advanced-stage disease in 60–80% of cases, a pattern distinct from adult colorectal cancer where screening programs and higher symptom awareness lead to earlier detection. Histologically, mucinous, and signet-ring cell subtypes are overrepresented in children, both of which carry poorer prognoses. Similar histopathologic patterns are seen in gastric adenocarcinoma of childhood, which is extremely rare—case series in the English literature seldom exceed five patients—and is almost uniformly diagnosed at stage IV.

Small bowel adenocarcinoma (SBA), although accounting for only 1–2% of pediatric GI adenocarcinoma cases in Korea, has been more extensively studied in adult and mixed-age cohorts, offering insight into its biology. Large retrospective studies, such as a multicenter analysis of over 1,700 patients in the SEER database, demonstrate that SBA is aggressive, with a tendency for early lymphatic spread. Prognosis is heavily stage-dependent, with five-year survival rates ranging from over 80% in localized disease to below 15% in metastatic cases. In children, where diagnosis is often delayed due to nonspecific symptoms and the anatomic inaccessibility of the small bowel, stage migration toward advanced disease is likely. Data from an Iranian series of small bowel tumors—though predominantly adult—showed median survival of just 12 months for adenocarcinoma, with tumor grade emerging as the only independent prognostic factor. Poorly differentiated (grade 3) tumors had significantly worse survival than well- or moderately differentiated lesions.

Recent advances in staging refinement have potential relevance for pediatric SBA as well. The international development and validation of a novel Tumor, Log Odds of Positive Lymph Nodes, and Metastasis (TLM) staging system has demonstrated improved prognostic discrimination over the conventional TNM classification. This is particularly pertinent in emergent pediatric cases, where adequate lymph node harvest (≥17 nodes) is rarely achieved due to urgent surgery for obstruction or perforation. The TLM system, by incorporating the log odds of positive lymph nodes (LODDS), maintains predictive accuracy even when fewer nodes are retrieved, offering a potentially valuable tool for better risk stratification in children.

Treatment principles for pediatric intestinal adenocarcinoma emphasize complete surgical excision with adequate margins and lymphadenectomy where feasible. In localized disease, surgery remains the only potentially curative modality. Adjuvant chemotherapy, typically fluoropyrimidine-based regimens, is extrapolated from adult protocols and used in node-positive disease or high-risk node-negative disease. In metastatic presentations, systemic chemotherapy may offer palliation and, rarely, long-term remission, though pediatric-specific evidence is minimal. The role of targeted therapies and immunotherapy is

virtually unexplored in children, though molecular profiling may eventually identify subgroups with actionable alterations.

The uniformly poor prognosis in advanced pediatric GI adenocarcinoma underscores the critical need for earlier diagnosis. This is complicated by the rarity of the disease, the nonspecificity of early symptoms, and the low index of suspicion among clinicians for carcinoma in a child. The Korean data highlight that nearly one-third of patients had either a relevant family history or an underlying condition predisposing to malignancy, suggesting that targeted surveillance in such populations could be beneficial. In adults, hereditary cancer syndromes such as Lynch syndrome, familial adenomatous polyposis, and Peutz–Jeghers syndrome confer elevated risks for GI adenocarcinomas, including small bowel primaries; whether similar genetic predispositions play a role in pediatric cases is plausible but incompletely characterized.

Collectively, these data suggest a multifaceted approach to improving outcomes: heightened awareness among pediatricians and gastroenterologists for persistent abdominal symptoms, even in the absence of classic red flags; genetic counseling and testing in children with suggestive personal or family histories; aggressive surgical management where feasible; and adaptation of adult-based adjuvant chemotherapy regimens to pediatric physiology. Incorporating prognostic tools such as CEA levels and refined staging systems like TLM could further individualize treatment planning.

In conclusion, adenocarcinoma of the intestine in children, though rare, is a highly aggressive malignancy with distinct clinical and pathologic features compared to adult disease. The Korean multicenter series—the largest of its kind—confirms the predominance of GI primaries, the overwhelming tendency toward late-stage diagnosis, the poor survival outcomes in GI compared to non-GI adenocarcinomas, and the prognostic value of elevated CEA. Supplementary evidence from international datasets on small bowel adenocarcinoma refines understanding of prognostic factors, especially lymph node assessment and tumor grade, and supports emerging staging innovations. Future progress will depend on early recognition strategies, improved access to specialized surgical and oncologic care, and collaborative research to adapt evolving adult treatment paradigms to the unique context of pediatric disease.

References:

1- Digoy GP, Tibayan F, Young H, Edelstein P: Adenocarcinoma of the rectum with associated colorectal adenomatous polyps in tuberous sclerosis: a case report. J Pediatr Surg. 35(3):526-7, 2000

2- Ibele AR, Koplin SA, Slaughenhoupt BL, Kryger JV, Friedl A, Lund DP: Colonic adenocarcinoma in a 13-year-old with cystic fibrosis. J Pediatr Surg. 42(10):E1-3, 2007

3- Schrock AB, Devoe CE, McWilliams R, Sun J, Aparicio T, Stephens PJ, Ross JS, Wilson R, Miller VA, Ali SM, Overman MJ: Genomic Profiling of Small-Bowel Adenocarcinoma. JAMA Oncol. 3(11):1546-1553, 2017

4- Ahn CH, Kim SC: Two case reports: Colorectal adenocarcinoma in children. Medicine (Baltimore). 96(46):e8074, 2017

5- Taghipour Zahir S, Heidarymeybodi Z, AleSaeidi S: Prognostic Factors and Survival Time in Patients with Small Bowel Tumors: A Retrospective Observational Study. Int J Surg Oncol. 2019:2912361, 2019

6- Yang HB, Namgoong JM, Kim KH, Kim DY, Park J, Shin HB, Youn JK, Lee S, Lee JW, Jung SE, Chung JH, Choe YM, Heo TG, Ho IG, Kim HY: Pediatric Adenocarcinoma in Korea: A Multicenter Study. Cancer Res Treat. 52(1):117-127, 2020
7- Dai ZH, Wang QW, Zhang QW, Yan XL, Aparicio T, Zhou YY, Wang H, Zhang CH, Zaanan A, Afchain P, Zhang Y, Chen HM, Gao YJ, Ge ZZ: Personalized four-category staging for predicting prognosis in patients with small bowel Adenocarcinoma: an international development and validation study. EBioMedicine. 60:102979, 2020

Appendiceal Stump Leak

Appendiceal stump leak is a rare but serious complication following appendectomy, particularly in laparoscopic procedures. Although appendectomy is widely regarded as a routine and safe surgery, the consequences of a compromised closure at the appendiceal base can be profound. The leak represents a failure of containment at the surgical site, often resulting in peritonitis, intra-abdominal abscess, sepsis, and prolonged hospitalization. While the incidence remains low, the clinical impact is significant enough to warrant close attention to technique, risk assessment, and postoperative monitoring.

At the heart of this complication lies the method of stump closure. During appendectomy—especially when approached laparoscopically—the surgeon must ensure the base of the appendix is securely sealed. In uncomplicated cases, this is typically achieved through the application of ligatures such as endoloops or intracorporeal knots. However, when the tissue is inflamed, necrotic, or gangrenous, the risk of inadequate closure increases. Poor tissue quality at the base, coupled with suboptimal technique or tool failure, can result in leakage of enteric contents into the abdominal cavity.

A wide array of closure techniques exists. Some surgeons favor traditional ligatures due to their cost-effectiveness and familiarity. Others opt for mechanical solutions such as endoscopic staplers, titanium clips, or polymer-based devices. In resource-limited settings, handmade suture loops or invaginating stitches may be preferred. The decision often comes down to the clinical scenario, the surgeon’s experience, and the tools at hand. Nevertheless, no universal consensus exists regarding a superior method. Each technique offers its own advantages and drawbacks, particularly when confronted with complex appendicitis involving perforation or abscess formation.

Clinical evidence offers a mixed view. In systematic comparisons between mechanical closure methods and ligatures, no statistically significant difference in overall postoperative complications has been consistently demonstrated. Nonetheless, staplers often yield shorter operative times and reduced wound infection rates, especially in pediatric patients. One analysis suggested that wound infection rates were nearly halved when staplers were used instead of endoloops. This benefit was most pronounced in cases of simple appendicitis, though less conclusive in complex or perforated scenarios. Still, cost remains a limiting factor for widespread stapler use, particularly in public or rural hospitals where financial constraints guide surgical decision-making.

The tissue condition at the time of surgery is a crucial determinant of outcome. Inflammation at the base of the appendix can impair suture integrity, increase friability, and

reduce the holding capacity of any closure technique. When the appendiceal base is compromised, a transfixing suture or invagination technique may offer a more secure seal by reinforcing the stump through burying it into the cecum wall. This method, though more time-consuming, has demonstrated reliable outcomes in both adult and pediatric populations when used judiciously. However, it demands a higher level of technical skill and may not be suitable for all surgical teams.

In cases where stump leak does occur, presentation is often within the first few days postoperatively. Patients may present with fever, abdominal pain, ileus, or signs of peritoneal irritation. In some instances, feculent discharge may be observed at the wound site, particularly in cases where a fistula has formed. Diagnostic imaging, especially contrast-enhanced computed tomography, is instrumental in identifying leaks, abscesses, or fistulous tracts. Prompt recognition is essential, as delays in diagnosis increase the risk of systemic infection and organ failure.

Management of appendiceal stump leaks depends on the severity and containment of the leak. In well-contained, low-output fistulas with no signs of diffuse peritonitis, conservative treatment may suffice. This includes bowel rest, intravenous fluids, broad-spectrum antibiotics, and close clinical monitoring. However, in most cases—particularly those involving pediatric patients, high-output fistulas, or generalized peritonitis—surgical intervention is necessary. Re-exploration may reveal an obvious defect in the stump, requiring debridement and secure re-ligation. In some cases, burying the stump or even performing a limited resection of the cecum may be required. Intra-abdominal drains are often placed to control contamination and monitor output. Early reoperation, although invasive, is associated with better outcomes than prolonged conservative treatment in unstable patients.

Pediatric cases present their own nuances. Children often present later in the course of illness, with more advanced disease at the time of surgery. As such, the incidence of perforation and gangrene is higher, which elevates the risk of stump complications. Moreover, the anatomical features of the pediatric appendix and cecum make certain closure methods less practical. In children, careful selection of closure technique, often favoring staplers or invaginating sutures, becomes particularly important. Furthermore, the psychological burden on families and the potential for growth-related complications make timely and effective resolution of stump leaks a pediatric priority.

In examining the broader literature, some observational studies have suggested that polymer or metal clips may perform as well as more expensive staplers in select cases. However, clips are not recommended when the base diameter exceeds one centimeter or when inflammation compromises clip grip. Misapplication or dislodgement of clips has been implicated in several reported stump leaks, underlining the importance of matching technique to the surgical context.

The reality remains that no technique guarantees immunity from stump complications. Even when best practices are followed, unpredictable variables such as patient anatomy, tissue

response, or unrecognized injury to adjacent bowel can contribute to leakage. What does emerge consistently across studies is the critical role of meticulous surgical technique. Surgeons must ensure adequate visualization, gentle tissue handling, and thorough assessment of the stump before concluding the procedure. When doubt exists regarding the reliability of a closure method, switching to a more robust technique or converting to open surgery should not be delayed.

Overall, while appendiceal stump leak is a relatively rare occurrence, its implications are significant. It exposes the patient to additional surgeries, prolonged recovery, increased healthcare costs, and in some cases, long-term morbidity. Prevention remains the best strategy, rooted in sound surgical judgment and appropriate technique selection. As the field evolves and technology advances, newer devices may offer enhanced sealing options. Until then, the best defense against stump leak remains a thoughtful, individualized approach that respects both the science and the art of surgery.

References:

1- Safavi A, Langer M, Skarsgard ED. Endoloop versus endostapler closure of the appendiceal stump in pediatric laparoscopic appendectomy. *Canadian Journal of Surgery*. 55(1):37–41, 2012

2- Mayir B, Ensari CO, Bilecik T, Aslaner A, Oruç MT. Methods for closure of appendix stump during laparoscopic appendectomy procedure. *Ulusal Cerrahi Dergisi*. 31(4):229–231, 2015

3- Mannu GS, Sudul MK, Bettencourt-Silva JH, Cumber E, Li F, Clark AB, Loke YK. Closure methods of the appendix stump for complications during laparoscopic appendectomy: a systematic review. *Cochrane Database of Systematic Reviews*. Issue 11:CD006437, 2017

4- Erikci VS. Pediatric appendicitis and its management: a review article. *Clinics in Surgery*. 2:1825, 2017

5- Ceresoli M, Tamini N, Gianotti L, Braga M, Nespoli L. Are endoscopic loop ties safe even in complicated acute appendicitis? A systematic review and meta-analysis. *International Journal of Surgery*. 68:40–47. (Referenced through commentary), 2019

6- Flores-Marín K, Rodríguez-Parra A, Trejo-Ávila M, Cárdenas-Lailson E, Delano-Alonso R, Valenzuela-Salazar C, Herrera-Esquivel J, Moreno-Portillo M. Laparoscopic appendectomy in complicated appendicitis with compromised appendix base: a retrospective cohort study. *Cirugía y Cirujanos*. 89(5):651–656, 2021

7- Das S, Ghosh A, Chakraborty P, Halder P. Appendicular stump blowout following an emergency appendectomy: an unusual complication. *Pediatrics & Health Research*. 6(6):25, 2021

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