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SURGICAL TREATMENT METHODS FOR CONGENITAL DEFECTS

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Abstract: One of the major difficulties in pediatric surgery today is congenital defects, which are seen in around 3 to 6 percent of babies and need prompt surgery to avoid complications and improve life quality. The research indicates that early surgery, along with the progress in anesthesia and recovery care, has led to a remarkable increase in survival rates and better long-term results for congenital defect patients.
Keywords: congenital defects, surgical treatment, pediatric surgery, minimally invasive surgery, cardiac anomalies, congenital malformations, surgical outcomes

Аннотация. Врождённые пороки развития представляют собой серьёзную проблему современной детской хирургии, затрагивая приблизительно от трёх до шести процентов новорождённых во всём мире и требуя своевременного хирургического вмешательства для предотвращения осложнений и улучшения качества жизни. Результаты исследования свидетельствуют о том, что раннее хирургическое вмешательство в сочетании с достижениями анестезиологии и послеоперационного ухода существенно повысило показатели выживаемости и отдалённые результаты лечения пациентов с врождёнными пороками развития.
Ключевые слова: врождённые пороки развития, хирургическое лечение, детская хирургия, малоинвазивная хирургия, врождённые пороки сердца, врождённые аномалии, результаты хирургического лечения
Annotatsiya: Tug'ma nuqsonlar zamonaviy bolalar jarrohligida jiddiy muammoni tashkil etadi, bu holat butun dunyo bo'ylab yangi tug'ilgan chaqaloqlarning taxminan uch foizdan olti foizigacha qismini qamrab oladi va asoratlarning oldini olish hamda hayot sifatini yaxshilash maqsadida o'z vaqtida jarrohlik muolajasini talab qiladi. Tadqiqot natijalari shuni ko'rsatadiki, erta jarrohlik anesteziologiya va operatsiyadan keyingi parvarish sohasidagi yutuqlar bilan birgalikda tug'ma nuqsonli bemorlarning omon qolish ko'rsatkichlari va uzoq muddatli davolash natijalarini sezilarli darajada yaxshilagan.
Kalit so'zlar: tug'ma nuqsonlar, jarrohlik davolash, bolalar jarrohlik, minimal invaziv jarrohlik, tug'ma yurak nuqsonlari, tug'ma anomaliyalar, jarrohlik natijalari

Introduction. Congenital defects are one of the main concerns of modern medicine, and they are the most pronounced structural or functional deviations from the norm that happen during intrauterine development and are either seen at birth or during early childhood [1]. The global rate of congenital anomalies still remains quite high, with almost three hundred thousand infants dying in the first four weeks of life every year mainly due to congenital defects as per the World Health Organization [2]. The surgical modalities for correcting these defects have gone through a remarkable evolution over the last hundred years, going from just providing symptomatic relief to curing the conditions and hence giving the patients the chance to live a normal life in terms of lifespan and quality. The establishment of dedicated children's surgery centers, the introduction of better imaging techniques, and the progress in neonatal intensive care have changed the outlook for newborns with congenital defects altogether [3]. In this article, we intend to explore the various surgical treatment methods available for congenital defects and evaluate their effectiveness, besides spotting future directions in this specialty through the in-depth literature review and analytical synthesis.

Methodology and Literature Analysis. The methodology of this study is based on a systematic review of the literature from both national and international sources dealing with surgical treatment of congenital defects. The literature review shows that surgery for congenital heart defects has made great strides, with Castaneda et al. proving that the early primary repair of complex cardiac anomalies results in better outcomes than staged palliative procedures [4]. The study of gastrointestinal congenital defects shows that conditions like esophageal atresia, intestinal atresia, and anorectal malformations need very skilled surgical techniques and thorough knowledge of embryological development for a successful correction [5].

Musculoskeletal congenital anomalies like clubfoot, developmental dysplasia of the hip, and congenital scoliosis impose specific surgical difficulties that take into account the growth potential and skeletal maturation [6]. The literature heavily relies on surgical timing as a main factor in determining the outcome, with some defects needing instant neonatal surgery and others getting the advantage of the delay allowing for patient growth and physiological stabilization. Among all kinds of congenital defect repairs, minimally invasive surgical techniques have become more and more widely accepted, with thoracoscopic and laparoscopic approaches showing less postoperative pain, shorter hospital stays and better aesthetic results when compared with the previous open ones [7].

Results and Discussion. The synthesis of the literature under review provides a variety of important conclusions concerning the operation for repairing congenital defects. Cardiac defects are the predominant group of congenital defects in need of surgical treatment, and current surgical mortality for complicated repairs has gone down to less than five percent at specialized hospitals, thus being a huge step forward compared to the past where 50 percent and more was the norm [4]. The use of the cardiopulmonary bypass technique that is particularly adjusted for neonates and infants has made it possible for surgeons to carry out the full repair of conditions that previously were not operable even at the patient's first week of life. The outcome of surgical management of gastrointestinal congenital defects illustrates a similar trend of improvement, as the survival rates of esophageal atresia repair have currently gone up to more than ninety percent provided that there are no cardiac or chromosomal anomalies [5]. The posterior sagittal approach has transformed the surgery of the year rectal malformations by making it possible for surgeons to see and thus preserve the sphincter mechanisms necessary for long-term hygiene very well.

A thorough examination indicates that surgical and medical intervention of patients from multidisciplinary teams composed of surgeons, anesthesiologists, neonatologists, and rehabilitation specialists yields the best results in all categories of congenital defect repair [8]. Thanks to the advancements in prenatal diagnosis through ultrasonography and fetal magnetic resonance imaging, the practice of specialized centers and the immediate postnatal intervention has been made possible thus no delays that used to compromise outcomes. However, the literature still points out the challenges that still persist like the necessity of performing multiple staged procedures for complex cases, long-term complications that require reoperation, and the psychological effects of congenital defects on the patients and their families. The analysis suggests that ongoing surgical technique improvements, the manufacture of biocompatible materials for reconstructive surgery, and further fetal surgical intervention in the future are the most likely areas of growth for the congenital defect treatment improvement.

The review of surgical techniques for neural tube defects, especially myelomeningocele and encephalocele, shows great advancements in both prenatal and postnatal intervention methods. The available data suggest that myelomeningocele fetal surgical repair done before the twenty-sixth week of pregnancy leads to a lesser requirement of ventriculoperitoneal shunting and better motor function results in comparison with postnatal repair. Postnatal surgical closure of neural tube defects needs scrupulous technique to avert cerebrospinal fluid leakage, infection, and

consequent neurological impairment. The evaluation shows that neurosurgical teams with extensive experience in dealing with these challenging cases attain better results, thus highlighting the pivotal role of case volume and hospital expertise in determining the surgical success rates of congenital central nervous system defects.

The surgical treatment of urogenital congenital anomalies brings about certain issues connected to the maintaining of kidney function and to the getting of urinary continence. Among the conditions that need special premeditated surgeries are posterior urethral valves, vesicoureteral reflux, and hypospadias which need to be planned with utmost care considering the developing urinary tract and reproductive organs [3]. A review of modern literature indicates that the endoscopic treatment of posterior urethral valves has established itself as the first choice for initial intervention, giving proper blockage relief with minimal morbidity when compared with open surgical methods. Hypospadias repair methods have changed a lot and single-stage repairs have been the answer to even severe proximal defects that previously needed the patient to endure multiple operations. The studies reviewed have put forward the point that preservation of the upper urinary tract through early intervention and long-term monitoring still remains the main aim in the management of congenital urogenital anomalies.

The strategy to treat congenital defects of the abdominal wall, particularly gastroschisis and omphalocele, drives home the message about the importance of an individualized surgical method based on the specifics of the defect and the patient's condition. Primary closure is still the method of choice for small defects with very little visceral-abdominal disproportion, whereas staged closure with temporary silos or tissue expanders is the solution for larger defects that need to be treated with caution against the development of abdominal compartment syndrome. A review of the literature shows that the advent of preformed spring-loaded silos has eased the management of gastroschisis, which has permitted gradual visceral reduction without general anesthesia in a lot of cases. The assessment of the management of omphalocele must consider the possible associated anomalies, especially heart defects and genetic disorders, which would have a great impact on surgical planning and prognosis. The review concludes that the improvements in neonatal intensive care, such as better ventilatory support and nutrition, have been a major factor in the rise of the survival rate of newborns with abdominal wall defects who are operated on.

Conclusion. The surgical treatment of congenital defects has undergone transformative advancement over recent decades, evolving from experimental interventions with uncertain outcomes to standardized procedures achieving excellent survival and functional results. The analysis demonstrates that success in treating congenital anomalies depends upon accurate prenatal and postnatal diagnosis, appropriate timing of surgical intervention, technical excellence in operative procedures, and comprehensive postoperative care delivered by multidisciplinary teams. Minimally invasive techniques continue to expand their role in congenital defect surgery, offering benefits of reduced surgical trauma while maintaining efficacy comparable to open procedures. The findings emphasize that specialized pediatric surgical centers with adequate case volumes achieve superior outcomes, supporting the concentration of complex congenital defect surgery at designated referral institutions.

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