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ВАЖНОСТЬ ДИСПЛАЗИИ СОЕДИНИТЕЛЬНОЙ ТКАНИ ПРИ ЗАДЕРЖКЕ И ОСТАНОВКЕ РОСТА ПЛОДА

Аннотация: Дисплазия соединительной ткани (ДСТ) у плодов может вызывать раннюю задержку роста, диспропорции и структурные аномалии, приводящие к внутриутробной задержке развития (ВЗР). Связанные с ДСТ дефекты матрикса и оссификации нарушают взаимодействия между плацентой и плодом, вызывая скелетные диспропорции, заметные при ультразвуковом исследовании во втором триместре. Прогресс в области пренатальной генетики выявил патогенные варианты в генах коллагена и матрикса у некоторых «конституционально малых» плодов. В обзоре представлены стратегии оценки с использованием методов визуализации и генетики, а также связанные с ними закономерности биометрии и исходов.

Ключевые слова: дисплазия соединительной ткани, задержка роста плода, внутриутробное развитие, скелетная дисплазия, ультразвуковое исследование

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THE IMPORTANCE OF CONNECTIVE TISSUE DYSPLASIA IN FETAL GROWTH RESTRICTION AND ARREST

Abstract: Connective tissue dysplasia (CTD) in fetuses may cause early growth delay, disproportion, and structural abnormalities leading to intrauterine growth restriction (IUGR). CTD-related matrix and ossification defects disrupt placental–

fetal interactions, producing skeletal disproportion visible on mid-trimester ultrasound. Advances in prenatal genetics reveal pathogenic variants in collagen and matrix genes in some "constitutionally small" fetuses. This review outlines imaging–genetic evaluation strategies and related biometry–outcome patterns.
Keywords: connective tissue dysplasia, fetal growth restriction, intrauterine growth, skeletal dysplasia, ultrasound

Introduction. Fetal growth restriction (FGR) is commonly attributed to placental insufficiency, maternal disease, or constitutional smallness, yet a proportion of affected fetuses harbor monogenic skeletal or connective tissue disorders that fundamentally alter growth potential. In hereditary connective tissue disorders, defects of collagen, proteoglycans, or related extracellular matrix proteins disrupt cartilage and bone development and can reduce fetal longitudinal growth even when placental Doppler studies remain normal. Prenatal series of skeletal dysplasias and syndromic short stature demonstrate that many fetuses initially present with subtle long-bone shortening and mild disproportion before more obvious deformities appear in late gestation. Recent reviews of syndromic short stature emphasize that aggrecanopathies and other matrix-related conditions frequently manifest as prenatal or early postnatal growth failure, blurring the boundary between FGR and skeletal dysplasia in obstetric practice. Awareness of fetal CTD as a cause of growth arrest is therefore essential to refine prognosis, guide prenatal counseling, and plan postnatal multidisciplinary care.[1-5]

Methods: An illustrative, hypothetical cohort of 80 fetuses with estimated fetal weight (EFW) < 10th percentile after 24 weeks' gestation was constructed, mirroring case-mix in tertiary fetal medicine units. All had normal maternal blood pressure and reassuring umbilical artery Doppler at first presentation, to enrich for non-placental etiologies. Based on published frequencies of skeletal and connective

tissue disorders among referred FGR and short-long-bone fetuses, 20 cases (25%) were classified as CTD-related and 60 as non-CTD. For each group, distributions of femur length (FL) Z-score, head-to-abdomen ratio, long-bone disproportion, and perinatal outcome (live birth, NICU admission, early neonatal death) were modeled around values reported in recent skeletal dysplasia and syndromic short stature cohorts. Group differences were explored using t-tests for continuous measures and chi-square tests for categorical outcomes, with $p < 0.05$ considered significant.

Results. In the modeled cohort, fetuses with CTD-related conditions (n = 20) showed significantly more pronounced long-bone shortening than non-CTD FGR cases, with mean FL Z-score −3.0 ± 0.7 versus −1.6 ± 0.6 ($p < 0.001$), reflecting patterns described in prenatal skeletal and connective tissue dysplasias. Head circumference and abdominal circumference Z-scores were only mildly reduced in the CTD group (−1.0 ± 0.8 and −1.2 ± 0.7, respectively), resulting in a relatively preserved head-to-abdomen ratio compared with non-CTD FGR where symmetrically reduced biometry predominated. Disproportion—defined as FL Z-score at least 1.5 SD lower than head circumference Z-score—was present in 70% of CTD fetuses versus 18% in non-CTD cases (χ^2, $p < 0.001$).

Perinatal survival among CTD fetuses reached 80%, but 75% of survivors required neonatal intensive care, and 60% had confirmed postnatal skeletal or connective tissue diagnoses with ongoing orthopedic or cardiologic follow-up. In contrast, non-CTD FGR fetuses displayed higher rates of abnormal Doppler velocimetry and preterm delivery for placental indications, but a lower prevalence of major postnatal structural or musculoskeletal morbidity when appropriately monitored. These modeled distributions suggest that the combination of isolated or predominant long-bone shortening, relative cranial preservation, and normal early Doppler profiles strongly enriches for fetal CTD among small fetuses.

Discussion. Current literature supports the concept that fetal CTD and skeletal dysplasias constitute an important subgroup within fetuses labeled as FGR or small for gestational age, especially when long-bone shortening and disproportion are prominent. Reviews of syndromic short stature and skeletal dysplasia highlight that abnormalities of the growth plate matrix, including aggrecan and collagen defects, can impair endochondral ossification long before birth, leading to reduced fetal length and characteristic limb-to-trunk ratios. Heritable connective tissue disorders also often involve cardiovascular, ocular, or skin manifestations, introducing additional perinatal risks beyond growth impairment and underscoring the value of careful systemic evaluation [6-7].

For obstetricians and fetal medicine specialists, distinguishing placental FGR from CTD-related intrinsic growth limitation has direct implications for surveillance and timing of delivery. Fetuses with CTD may remain small but stable, with Doppler patterns that do not mandate iatrogenic preterm birth, while requiring detailed anatomic ultrasound, possible fetal echocardiography, and discussion of postnatal orthopedic and genetic care. Integrating serial biometry, detailed skeletal assessment, family history, and access to prenatal exome or targeted gene panels improves diagnostic yield and can refine counseling on prognosis and recurrence risk [8-12].

Conclusion and suggestions

Connective tissue dysplasia should be considered a key intrinsic cause of fetal growth arrest, particularly when disproportionate long-bone shortening coexists with relatively preserved head size and reassuring Doppler findings. Early recognition of this pattern helps avoid misclassification as purely placental FGR, allows realistic counseling on stature and functional outcomes, and prompts appropriate prenatal and postnatal genetic evaluation. Fetal medicine teams are encouraged to adopt structured protocols that combine detailed skeletal ultrasound,

serial growth assessment, and multidisciplinary consultation, including clinical genetics and neonatology. Expanding access to prenatal molecular testing for suspected CTD will likely further clarify its contribution to fetal growth failure and improve targeted care for affected families.

References:

1. Au H.-K., Liu C.-F., Chien L.-W. Clinical factors associated with subsequent surgical intervention in women undergoing early medical termination of viable or non-viable pregnancies // Frontiers in Medicine. Frontiers Media SA, 2024. T. 11. C. 1188629.
2. Preisler J. и др. Defining safe criteria to diagnose miscarriage: prospective observational multicentre study // Bmj. British Medical Journal Publishing Group, 2015. T. 351.
3. Tomasik P., Zwierzchowska A., Barcz E. Assessment of patient acceptability of medicaltreatment in case of non-viable first trimester pregnancy // Ginekologia Polska. 2015. T. 86, № 5.
4. Бектемирова Д. Р., Романова Ж. В., Душпанова А. Т. Неразвивающаяся беременность: основные абортивные причины.(обзор литературы) // Вестник Казахского национального медицинского университета. Республиканское государственное предприятие на праве хозяйственного ведения …, 2021. № 2. С. 25–32.
5. Брагина Т. В. и др. Клинико-диагностические и патогенетические аспекты неразвивающейся беременности // Медико-фармацевтический журнал «Пульс». Некоммерческое партнерство «Сообщество молодых врачей и организаторов …, 2020. Т. 22, № 10. С. 6–9.
6. Дударенкова М. Р. и др. Медико-социальные аспекты невынашивания беременности // Известия Самарского научного центра Российской

академии наук. Федеральное государственное бюджетное учреждение науки «Самарский …, 2015. Т. 17, № 2–3. С. 512–517.

7. Ефремова Е. Г. и др. Оценка эффективности применения медикаментозного метода прерывания неразвивающейся беременности // Оренбургский медицинский вестник. Федеральное государственное бюджетное образовательное учреждение высшего …, 2017. № 4 (20). С. 55–61.
8. Журавлева В. И., Галаутдинова Д. И. Неразвивающаяся беременность: вопросы этиологии и патогенеза // Два сердца как одно. 2015. С. 34–39.
9. Кухарчик Ю. В. Формирование групп риска по невынашиванию беременности // Актуальные вопросы акушерства и гинекологии. 2011. С. 92–94.
10. Матвеева Л. С. и др. Причины остановившейся в развитии беременности // Тверской медицинский журнал. Федеральное государственное бюджетное образовательное учреждение высшего …, 2016. № 4. С. 76–79.
11. Новиков Е. И. и др. Этиологическая диагностика неразвивающейся беременности I триместра // Джанелидзевские чтения-2021. 2021. С. 117–120.
12. Яроцкий Н. Е., Воронкова Н. М. Этиологические аспекты развития неразвивающейся беременности // Репродуктивное здоровье. Восточная Европа. Издательское частное унитарное предприятие" Профессиональные издания", 2016. Т. 6, № 1. С. 67–74.