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Original Article

An Overview of Treatment in Pediatric Bladder-bowel Dysfunction: A Single-Center Experience

Pediatrik Mesane Bağırsak Disfonksiyonunda Tedaviye Bakış: Tek Merkezli Deneyim

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ABSTRACT

Objective: This study aimed to evaluate the clinical characteristics, treatment responses, and outcomes of pediatric patients diagnosed with bladder-bowel dysfunction, highlighting a structured management approach including urotherapy, pharmacotherapy, and rehabilitation techniques.

Method: A retrospective study was conducted with 1846 children aged 5-18 years diagnosed with bladder-bowel dysfunction at Bakırçay University Çiğli Training and Research Hospital between 2022 and 2025. Patients with neurological disorders were excluded. Data on demographics, bladder-bowel symptom scores, treatment modalities, uroflowmetry results, and treatment outcomes were collected. Conservative treatments included use of osmotic-laxatives and urotherapy. Patients unresponsive to initial therapies received treatment with antimuscarinics, biofeedback, and transcutaneous electrical nerve stimulation where appropriate.

Results: The mean age of the patients was 104.4 months. Female predominance (67%) was observed. Conservative management alone successfully resolved symptoms in 512 patients without vesicoureteral reflux or recurrent urinary tract infections. Patients with higher bladder-bowel symptom scores (>20) and pathological uroflowmetry results required biofeedback and, in some cases, transcutaneous electrical nerve stimulation. No relapse was observed in any subgroup of patients during the 6-month follow-up period. Effective management of constipation and lifestyle modifications were critical for treatment success.

Conclusion: A stepwise treatment protocol focusing on bowel regulation, urotherapy, and individualized interventions provides effective symptom control and prevents disease progression in pediatric bladder-bowel dysfunction. Early diagnosis, attention to modifiable risk factors such as constipation, and long-term adherence to behavioral strategies are essential for optimal treatment outcomes. Prospective studies with extended follow-up periods are warranted.

Keywords: Bladder-bowel dysfunction, children, urotherapy, constipation, biofeedback, TENS

ÖZ

Amaç: Bu çalışmada, pediyatrik yaş grubunda mesane-barsak disfonksiyonu tanısı alan hastaların klinik özellikleri, tedavi yanıtları ve sonuçları değerlendirilmiş; üroterapi, farmakoterapi ve rehabilitasyon tekniklerini içeren yapılandırılmış bir tedavi yaklaşımı vurgulanmıştır.

Yöntem: 2022-2025 yılları arasında Bakırçay Üniversitesi Çiğli Eğitim ve Araştırma Hastanesi'nde mesane-barsak disfonksiyonu tanısı konulan, 5-18 yaş aralığındaki 1846 çocuk retrospektif olarak incelenmiştir. Nörolojik bozukluğu olan hastalar çalışmaya dahil edilmemiştir. Demografik veriler, mesane-barsak semptom skorları, tedavi yöntemleri, üroflowmetri sonuçları ve tedavi sonuçları toplanmıştır. Koruyucu tedaviler arasında ozmotik laksatifler ve üroterapi yer almıştır. Başlangıç tedavilerine yanıt vermeyen hastalara uygun durumlarda antimuskarinikler, biofeedback ve transkutanöz elektriksel sinir stimülasyonu uygulanmıştır.

Bulgular: Ortalama yaş 104,4 ay olarak bulunmuştur. Hastalarda kız cinsiyet baskınlığı gözlenmiştir (%67). Vezikoüreteral reflü veya tekrarlayan idrar yolu enfeksiyonu olmayan 512 hastada yalnızca konservatif tedavi ile semptomlar başarıyla düzelmiştir. Yüksek mesane-barsak semptom skoruna (>20) sahip olan ve patolojik üroflowmetri sonuçları bulunan hastalarda biofeedback ve bazı durumlarda transkutanöz elektriksel sinir stimülasyonu gerekmiştir. Altı aylık takip sürecinde hiçbir alt grupta nüks gözlenmemiştir. Etkili konstipasyon yönetimi ve yaşam tarzı değişiklikleri tedavi başarısı için kritik bulunmuştur.

Sonuç: Barsak düzenlenmesine, üroterapiye ve bireyselleştirilmiş müdahalelere odaklanan basamaklı bir tedavi protokolü, pediyatrik mesane-barsak disfonksiyonunda etkili semptom kontrolü sağlamakta ve hastalık progresyonunu önlemektedir. Erken tanı, konstipasyon gibi değiştirilebilir risk faktörlerine dikkat edilmesi ve davranışsal stratejilere uzun vadeli uyum, optimal sonuçlar için gereklidir. Genişletilmiş takip süresi içeren ileriye dönük çalışmalara ihtiyaç vardır.

Anahtar Kelimeler: Mesane-barsak disfonksiyonu, çocuklar, üroterapi, konstipasyon, geribildirim, TENS

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INTRODUCTION

Bladder-bowel dysfunction (BBD) refers to a set of lower urinary tract symptoms that are often accompanied by bowel complaints[1]. Lower urinary tract symptoms can manifest in many forms. They may present with symptoms such as urinary incontinence, abnormal daily urination frequency, urge to urinate, hesitancy, and straining during urination, weak urine stream, intermittent urination, and dysuria[2]. Bowel dysfunction often manifests itself in the form of primary constipation and/or fecal incontinence[2]. The prevalence of BBD in school-age children is between 9% and 21% in the literature[3,4]. The Bladder-Bowel Dysfunction Symptom Scoring system (BBDSS) is used to screen for, diagnose, and evaluate the treatment outcomes of BBD[5]. Standard urotherapy for both the patient and family involves non-pharmacologic and non-surgical management, consisting of training and behavioural management, using a bladder and bowel diary, and regular follow-up[6]. Standard urotherapy includes management of proper voiding function and demystification, maintaining appropriate and regular bladder and bowel habits, and compliance with balanced fluid intake and dietary recommendations[6,7]. In the literature, the prevalence of BBD was reported as 9.1% in a study covering 829 pediatric patients. It was understood that the probability of suffering from lower urinary tract problems was 6.8 times higher in children with complaints of constipation[4]. Standard urotherapy and proper management of constipation form the basis of BBD treatment. Pharmacotherapy and surgical treatment of lower urinary tract dysfunction should only be considered in cases that do not respond fully to first-line conservative treatment. If cases do not respond to treatment with urotherapy and constipation management, medical treatments should be initiated. In cases that do not respond to medical treatment, rehabilitation methods other than pharmacological treatments should be considered, given the close interaction between the bladder and the bowel due to their shared neural network and pelvic floor muscles[8]. These methods of rehabilitation are classified as biofeedback, pelvic floor physiotherapy, and neuromodulation[9]. This article focuses on the methods used in diagnosing and treating BBD. Considering the comfort and quality of life of children, rehabilitation methods that are useful in patients with such a common health problem can be used to shorten the treatment period, and help patients to recover quickly.

MATERIALS and METHODS

This study was conducted by retrospectively examining pediatric patients aged 5-18 years who were followed up with the diagnosis of BBD in the Ppediatric nephrology and urology clinics between 2022 and 2025. Ethical approval of the study was obtained from Non-Invasive Clinical Research Ethics Committee of Bakırçay University (approval number: 2243, dated: 07.05.2025). Patients with a Bladder-BBDSS of 13 and above were included in the study. Patients with known neurological disorders were excluded from the study. After obtaining approval from the local ethics committee, the following information was collected from patient files: age, age at presentation, complaints, presence of constipation and urinary incontinence, BBDSS, accompanying urological and nephrological anomalies, presence of infection, results of uroflowmetric evaluations, medications used, and rehabilitation methods applied during treatment.

Statistical Analysis

Descriptive statistics were used to summarize demographic data, clinical characteristics, and treatment outcomes. Continuous variables such as age and BBDSS were expressed as means with ranges or standard deviations, where appropriate. Categorical variables, including treatment modalities, presence of vesicoureteral reflux (VUR), recurrent urinary tract infections (UTIs), and relapse rates, were reported as numbers and percentages. Patients were stratified into subgroups based on baseine BBDSS levels, uroflowmetry findings, and response to their first-line treatment modalities. Treatment responses were assessed at predefined intervals (2, 6, and 9 months), and clinical improvement was defined as a reduction in BBDSS to below 13 and absence of symptom relapse. No inferential statistical tests (e.g., t-tests, chi-square tests) were applied, as the primary objective was to describe treatment patterns and outcomes rather than to statistically compare efficacies of conservative, and surgical interventions applied.

RESULTS

A total of 1846 children diagnosed with BBD were included in the study. The mean age of the participants was 104.4 months (range: 60-212.4 months). At the time of admission, the mean BBD score was 13.5±4.2 among patients who responded to conservative therapy alone (Table 1). Among the study population, 512 patients (74% male) received treatment only with osmotic-laxative drugs and urotherapy for 3 months.

All presented with urinary incontinence, and none had VUR or recurrent UTIs. This group had comparatively lower BBD scores and exhibited no relapses during the initial 6-month follow-up period (Table 2). The remaining 1334 patients had more complex clinical presentations, including recurrent UTIs (n=213), and concomitant VUR (n=38). Clinical presentations in all of these patients were consistent with either overactive bladder (OAB) or urinary incontinence. Patients diagnosed with OAB (n=412) received treatment with oxybutynin (n=267), propiverine (n=145) or , both in combination with osmotic-laxative therapy. Similarly, 922 patients presented with urinary incontinence but without OAB. Among them, 756 patients had BBDSS <20 and were treated with oxybutynin (n=542) or propiverine (n=214) in combination with an osmotic-laxative medication. None of these subgroups exhibited relapse during the first 6 months of treatment. A subgroup of 166 patients with BBDSS >20 was further analyzed. Among them, 34 patients exhibited pathological findings on uroflowmetry and were started on biofeedback therapy for 10 sessions in addition to treatment with propiverine and osmotic-laxatives. The remaining 132 patients were treated with either oxybutynin (n=87) or propiverine (n=45) plus an osmotic-laxative drug. At the end of the second month, all patients in this subgroup achieved less than 50% clinical improvement. As a result, biofeedback therapy (8 sessions) combined with propiverine and an osmotic-laxative was initiated for all 166 patients. At the end of this intervention, all patients had BBDSS <13 and showed no relapses during the initial 6-month follow-up period (Table 3). Nineteen out of 34 patients with uroflowmetry abnormalities at baseline responded to the treatment with 10-session biofeedback protocol. The remaining 17 patients required 10 additional biofeedback sessions, resulting in a 9-month treatment course. Of these, 6 patients still had persistent symptoms and were treated with transcutaneous electrical nerve stimulation (TENS) for an additional 4 months. All but one patient responded favourably to this combined treatment regimen.

Table 1. General characteristics of the study population

Variables	Values
Total number of patients	1846
Age (mean, range) (months)	104.4 (60-212.4)
BBDSS (mean ± SD)	13.5±4.2 (in 512 patients)
Female/male (%)	67/ 33

BBDSS: Bladder-Bowel Dysfunction Symptom Score

Table 2. Treatment modalities and patient subgroups

Subgroup characteristics	n	Treatments used	Relapse in the first 6 months
BBDSS ≥13, no VUR or recurrent UTI, all patients with incontinence	512	Osmotic-laxative + Urotherapy (3 months)	No
VUR (+), recurrent UTI	213 (143 male)	OAB/incontinence compatible	No
OAB	412	Oxybutynin + Osmotic-laxative (n=267), Propiverine + Osmotic-laxative (n=145)	No
Urinary incontinence (non-OAB), BBDSS <20	756	Oxybutynin + Osmotic-laxative (n=542), Propiverine + Osmotic-laxative (n=214)	No
BBDSS >20: with pathological uroflowmetry results	34 (31 female)	10 sessions biofeedback + Propiverine + Osmotic-laxative	No
BBDSS >20: without pathological uroflowmetry results	132 (96 female)	Oxybutynin/Propiverine + Osmotic-laxative	No

BBDSS: Bladder-Bowel Dysfunction Symptom Score, VUR: Vesicoureteral reflux, UTI: Urinary tract infection, OAB: Overactive bladder

Table 3. Treatment Outcomes of Patients with BBDSS >20				
Treatment groups	**n**	**Outcomes of 2-month treatment**	**Final interventions**	**Relapse**
Biofeedback + Propiverine + Osmotic-laxative (BBDSS >20)	166	<50% symptomatic improvement in all cases	Switch to propiverine +8 biofeedback sessions	No
Uroflowmetry pathology group (of above)	34	19 cases improved (BBDSS <13), 17 cases needed longer treatment	+10 biofeedback sessions maintained up to 9 months	
Extended group with persistent symptoms after 9 months	6	Persistent complaints	TENS for 4 months	Ongoing
Non-responders to all therapies	1	50% reduction in symptoms	All treatment modalities were maintained	-
BBDSS: Bladder-Bowel Dysfunction Symptom Score, TENS: Transcutaneous electrical nerve stimulation				

DISCUSSION

This study presents one of the most comprehensive clinical evaluations of BBD in a large cohort of 1846 pediatric patients and a detailed stratification based on symptom severity and treatment response was performed. A major strength of the study lies in the structured stepwise approach to therapy-ranging from conservative management to pharmacological and behavioural interventions such as biofeedback and TENS-which was tailored to each patient's clinical status and symptom burden.

In our study, the female gender was more predominant among children diagnosed with BBD. This finding is consistent with previous reports indicating a higher prevalence of BBD among girls compared to boys[10]. Anatomical, hormonal, and behavioral factors have been proposed to explain this gender disparity. The higher proportion of female patients in our cohort supports the notion that girls may be at a greater risk for developing both functional lower urinary tract symptoms and constipation, emphasizing the need for gender-specific preventive strategies. The global burden of chronic kidney disease (CKD) in children has been increasing, and voiding dysfunctions, particularly those associated with BBD, have been recognized as one of the most frequent and preventable contributors to this higher prevalence of CKD[11]. Previously experienced UTIs and untreated dysfunctional voiding during childhood not only increase the risk of CKD in later life but are also associated with increased morbidity and mortality, as well as imposing long-term economic burden on healthcare systems[12]. Consequently, early diagnosis and appropriate treatment strategies should aim not only to reduce medical complications but also to decrease public health costs in the long run. Among the modifiable risk factors, constipation is of particular clinical importance. Remarkably, resolution of constipation alone can lead to significant improvement -or even complete resolution- of urinary symptoms in many children[13]. Recurrent UTIs are often exacerbated by underlying constipation, which is strongly associated with poor dietary habits and a sedentary lifestyle[14]. Therefore, addressing nutrition and physical inactivity should be integral parts of any treatment plan. Promoting adequate hydration, a fiber-rich diet, and regular physical activity can improve both bowel and bladder health and reduce the reliance on pharmacologic interventions. In this study, children without VUR or recurrent UTIs who were treated with osmotic laxatives and urotherapy showed no relapse during the first six months. This data align with previous findings suggesting that non-invasive strategies are effective in the management of early-stage BBD[2]. Importantly, for patients with VUR and recurrent UTIs, long-term urotherapy-including timed voiding, morning and bedtime urination, generous hydration, and avoiding holding behaviour-should not be applied as a short-term treatment but must be integrated into the patient's daily life as a preventive lifestyle modification. Sustained adherence to these routines significantly reduces disease recurrence and progression[15]. In patients with more severe symptoms (BBDSS >20), especially those with pathological uroflowmetry findings, biofeedback therapy was highly effective. However, nearly half of this subgroup required extended therapy sessions or adjunctive TENS for optimal clinical improvement. This observation highlights the importance of individualized treatment timelines, which are often underemphasized in the literature[16]. Furthermore, the combination of antimuscarinic agents (oxybutynin or propiverine) with osmotic laxatives yielded consistent remission across all non-OAB incontinence

subgroups. These results underscore the advantage of addressing both bowel and bladder dysfunction concurrently- a strategy supported by multiple studies[13,15]. The most notable outcome of this study is the absence of relapse across all treatment groups during the six-month follow-up period. This favorable outcome supports the reliability of the BBDSS scoring system in stratifying disease severity and guiding targeted therapy. Moreover, it reinforces the role of early, structured, and individualized management in preventing long-term renal complications and reducing the societal and financial burden associated with untreated BBD.

As a final remark, it is essential to rule out underlying urological anomalies before initiating standard BBD protocols. Anatomic abnormalities may mimic or complicate symptoms and, if overlooked, may result in the persistence of symptoms or progression to renal impairment[13].

CONCLUSION

In conclusion, this study proposes a robust and adaptable treatment framework for pediatric BBD. Future research should focus on prospective validation of this hierarchical approach, as well as long-term monitoring of renal outcomes and cost-effectiveness. Particular attention should be given to behavioral interventions, early diagnosis of constipation, and lifestyle modifications, which remain central to both the treatment and prevention of BBD.

Ethics

Ethics Committee Approval: A retrospective study was conducted in institute after the approval of Non-Invasive Clinical Research Ethics Committee the Bakırçay University, (approval number: 2243, dated: 07.05.2025).

Informed Consent: Retrospective study.

Footnotes

Author Contributions

Surgical and Medical Practices: M.B.Ö., H.T., Ö.Ö.Ş., Concept: M.B.Ö., Ö.E., Ö.Ö.Ş., Ö.O., Design: M.B.Ö., Ö.E., Data Collection or Processing: M.B.Ö., H.T., Ö.Ö.Ş., Ö.O., Analysis or Interpretation: M.B.Ö., H.T., Ö.Ö.Ş., Ö.O., Literature Search: M.B.Ö., Ö.E., Ö.Ö.Ş., Ö.O., Writing: M.B.Ö., Ö.Ö.Ş., Ö.O.

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REFERENCES

1. Austin PF, Bauer SB, Bower W, Chase J, Franco I, Hoebeke P, et al. The standardization of terminology of lower urinary tract function in children and adolescents: update report from the standardization committee of the International Children's Continence Society. Neurourol Urodyn. 2016;35(4): 471-81. http://doi.org/ 10.1002/nau.22751.
2. Dos Santos J, Lopes RI, Koyle MA. Bladder and bowel dysfunction in children: an update on the diagnosis and treatment of a common, but underdiagnosed pediatric problem. Can Urol Assoc J. 2017;11(1-2S): 64-72. http://doi.org/ 10.5489/cuaj.4411.
3. Yüksel S, Yurdakul AÇ, Zencir M, Çördük N. Evaluation of lower urinary tract dysfunction in Turkish primary schoolchildren: An epidemiological study. J Pediatr Urol. 2014;10(6): 1181-6. http://doi.org/ 10.1016/j.jpurol.2014.05.008.
4. Sampaio C, Sousa AS, Fraga LGA, Veiga ML, Bastos Netto JM, Barroso U. Constipation and Lower Urinary Tract Dysfunction in Children and Adolescents: A Population-Based Study. Front Pediatr. 2016;4: 101. http://doi.org/10.3389/fped.2016.00101.
5. Sumboonnanonda A, Sawangsuk P, Sungkabuth P, Muangsampao J, Farhat WA, Piyaphanee N. Screening and management of bladder and bowel dysfunction in general pediatric outpatient clinic: a prospective observational study. BMC Pediatr. 2022;22(1): 288. http://doi.org/ 10.1186/s12887-022-03360-9.
6. Killeen S. Improving patients' bladder and bowel dysfunction assessments. Br J Nurs. 2023;32(15): 716. http://doi.org/ 10.12968/bjon.2023.32.15.716.
7. Nieuwhof-Leppink AJ, Hussong J, Chase J, Larsson J, Renson C, Hoebeke P, et al. Definitions, indications and practice of urotherapy in children and adolescents: - A standardization document of the International Children's Continence Society (ICCS). J Pediatr Urol. 2021;17(2): 172-81.
8. Aguiar LM, Franco I. Bladder bowel dysfunction. Urol Clin North Am. 2018;45(4): 633-40. http://doi.org/10.1016/j.ucl.2018.06.010.
9. Afshar K, Dos Santos J, Blais AS, Kiddoo D, Dharamsi N, Wang M, et al. Canadian Urological Association guideline for the management of bladder and bowel dysfunction in children. Can Urol Assoc J. 2021;15(2); 13-8. http://doi.org/ 10.5489/cuaj.6975.
10. Meena J, Mathew G, Hari P, Sinha A, Bagga A. Prevalence of bladder and bowel dysfunction in toilet-trained children with urinary tract infection and/or primary vesicoureteral reflux: a systematic review and meta-analysis. Front Pediatr. 2020;8: 84. http://doi.org/ 10.3389/fped.2020.00084.
11. Harambat J, van Stralen KJ, Kim JJ, Tizard EJ. Epidemiology of chronic kidney disease in children. Pediatr Nephrol. 2012;27(3): 363-73. http://doi.org/ 10.1007/s00467-011-1939-1.
12. Bernardes RDP, Bresolin NL, Guimarães Penido MGM. Prevention of pediatric chronic kidney disease. Urol Nephrol Open Access J. 2020 Oct 23;8(5):139-46. doi:10.15406/unoaj.2020.08.00293.
13. Zaffanello M, Banzato C, Piacentini G. Management of constipation in preventing urinary tract infections in children: a concise review. Eur Res J. 2019;5: 236-43. http://doi.org/ 10.18621/eurj.412280
14. Afzal NA, Tighe MP, Thomson MA. Constipation in children. Ital J Pediatr. 2011;37(1): 28.

15. Assis GM, Silva CPC da, Martins G. Urotherapy in the treatment of children and adolescents with bladder and bowel dysfunction: a systematic review. J Pediatr. 2019;95(6): 628-41.

16. Oldenhof AP, Linde JM, Hofmeester I, Steffens MG, Kloosterman-Eijgenraam FJ, Blanker MH. Managing children with daytime urinary incontinence: a survey of Dutch general practitioners. Eur J Gen Pract. 2023;29(1): 2149731.