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Recurrent Lumbar Disc Herniations in an Adolescent Patient: A Case Report and Review of Management Challenges

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Background: Intervertebral disc herniation (IVDH) is rare in adolescent populations, and most respond well to conservative management or a single surgical intervention. Recurrent postoperative herniations are uncommon and pose unique management challenges.

Case Report: We present a 19-year-old woman with no major risk factors who experienced 4 lumbar IVDHs, requiring 3 microdiscectomies and one revision surgery between ages 16 and 19. Despite following medical and rehabilitation protocols and receiving multiple epidural steroid injections, she developed recurrent radicular symptoms and progressive neurological deficits, ultimately requiring an L3-L4 microdiscectomy. Postoperatively, she showed improvement in pain and overall functional status.

Conclusions: This case highlights the limitations of adult-based treatment paradigms for adolescent IVDH. Recurrent herniations in these patients underscore the need for dedicated treatment protocols, long-term follow-up strategies, and further research into age-specific medical, interventional, and surgical management approaches.

Key words: Intervertebral disc herniation, discectomy, microdiscectomy, epidural steroid injection

BACKGROUND

Intervertebral disc herniation (IVDH) is uncommon in adolescent patients. Studies (1) demonstrate only 0.5% to 3% of all patients undergoing surgery for lumbar IVDH are under 18 years of age. The most common causes of IVDH in these patients include acute trauma, obesity, and juvenile kyphosis. A family history of IVDH is also associated with development of this condition in younger individuals (2). IVDH is more common among athletes, particularly those who participate in collision sports, gymnastics, wrestling, and weightlifting (3). However, prominent studies (4) indicate that 62% of all individuals with lumbar IVDH do not have specific patient-identified inciting events; those who do have patient-identified inciting events often report nonlifting events as the cause of herniation (e.g., activities of daily living, simple movements).

In adolescent patients, clinical presentation of IVDH is similar to that of adults. Patients typically experience low back pain, sometimes accompanied by radicular symptoms (e.g., lower-extremity pain, paresthesias, weakness). In severe cases (2), leg weakness or red flag signs (e.g., bowel/bladder dysfunction, saddle anesthesia) may be present. Lumbar IVDH is diagnosed using magnetic resonance imaging (MRI) of the lumbar spine.

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MRI most commonly reveals herniation at L4-L5 or L5-S1 levels; over 90% of adolescent disc herniations occur at these 2 levels, which are also the most common levels for herniation in adults (2,3,5).

Initial management is conservative unless red flag signs or progressive neurological deficits are present. In nonsevere and nonemergent cases, first-line treatment includes physical therapy focused on lumbar and core strengthening, gait training (if gait instability is present), stretching, and manual therapy (6). Patients are initially advised to take over-the-counter pain medications (e.g., Tylenol, nonsteroidal anti-inflammatory drugs [NSAIDs]) for pain management. Neuropathic agents (e.g., gabapentin, Lyrica) may be prescribed if the patient exhibits radicular symptoms (7). If conservative treatments fail and radicular symptoms persist, epidural steroid injection (ESI) is often recommended (8). Surgery, such as discectomy or microdiscectomy, is reserved for patients with red flag signs or intractable pain despite trialing other treatment measures (1-3).

Surgical outcomes for lumbar discectomy in adolescent patients are generally favorable. Some studies (1,2) report a reherniation rate of roughly 20% after initial surgery, but others report rates as high as 45%. Other studies (1) indicate that 24% of patients require reoperation, with an average reoperation occurring 3.1 years after the initial surgery. In rare cases, a second or even third reoperation may be necessary.

Informed Consent

Patient-informed consent was obtained for presenting this case report. This case does not include any identifiable patient information and therefore is exempt from Institutional Review Board review.

CASE PRESENTATION

We present a 19-year-old woman with a past medical history significant for recurrent lumbar IVDH status post L5-S1 microdiscectomy (June 2022) and L4-L5 microdiscectomy (January 2024) with revision L4-L5 microdiscectomy (August 2024). The patient was admitted to the Children's Hospital at Montefiore (CHAM) in the Bronx, NY, for acute-on chronic low back pain with bilateral radicular symptoms. A Pediatric Rehabilitation consult was requested for guidance on pain management.

The patient initially developed radicular low back pain in 2021. She had no identifiable risk factors aside from very mild scoliosis. Her first lumbar MRI at an outside facility in March 2022 revealed a large left paracentral L5-S1 disc herniation. After undergoing a lumbar ESI with minimal improvement, she was referred to CHAM for a second opinion. She initially declined surgery, but later elected to undergo an L5-S1 microdiscectomy in June 2022. She initially improved, but had recurrence of symptoms approximately a year later. A repeat MRI in October 2023 (Fig. 1) showed a large L4-L5 disc herniation. She received another lumbar ESI in November 2023 but only experienced temporary pain relief. The patient subsequently underwent an L4-L5 microdiscectomy in January 2024 with initial improvement, but her symptoms recurred later that year. A lumbar MRI in June 2024 (Fig. 2) revealed reherniation at L4-L5, requiring a

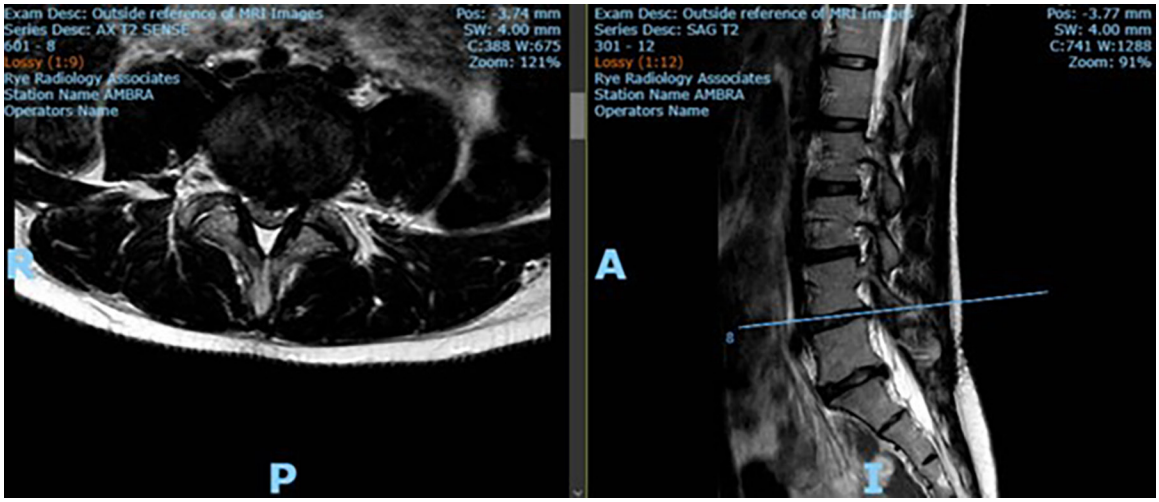

Fig. 1. Lumbar MRI from October 2023.

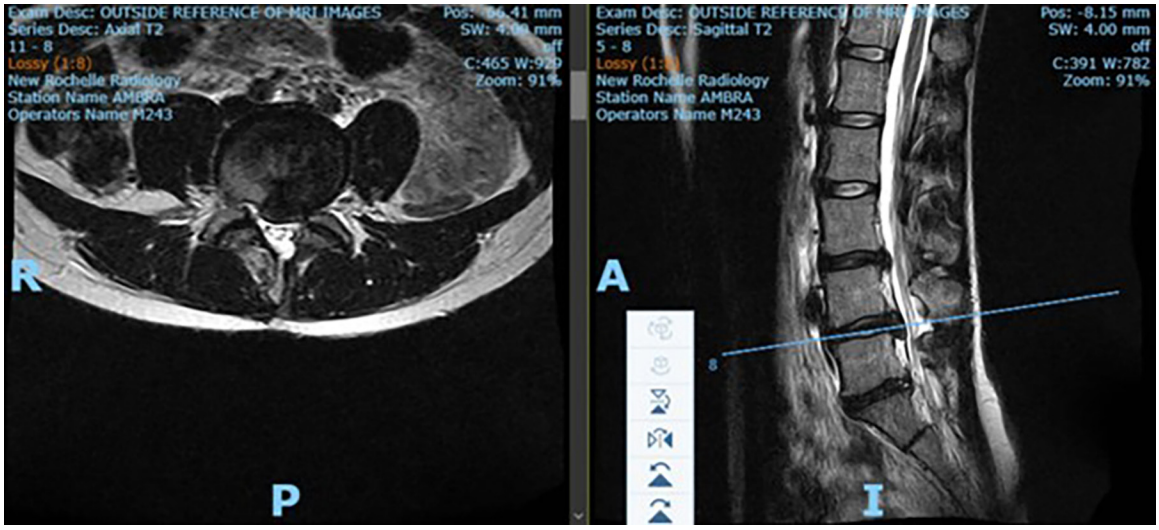

Fig. 2. Lumbar MRI from June 2024.

revision microdiscectomy in August 2024. A follow-up MRI in January 2025 (Fig. 3) showed broad-based disc bulges at L4-L5, worsening disc bulging at L5-S1, and a stable central disc protrusion at L3-L4.

In May 2025, the patient returned to the emergency department with bilateral radicular back pain in the absence of physical trauma. Lumbar spine MRI (Fig. 4) revealed an increased central disc herniation at L3-L4, causing worsening spinal canal stenosis with mass effect on the traversing L4 nerve roots. The Pediatric Rehabilitation team was consulted for pain management and therapy recommendations. On exam, manual muscle testing (MMT) revealed 2/5 strength in left hip flexors and knee extensors, as well as 3/5 in these muscle groups on the right; remainder of strength exam showed 4+/5 in bilateral ankle dorsiflexors, plantarflexors, and extensor hallucis longus. The patient declined a gait assessment due to pain. The Rehab team recommended a multimodal approach to pain control, including trialing gabapentin for radicular symptoms, which provided excellent relief of neuropathic pain.

The patient underwent an L3-L4 microdiscectomy during the same admission. She experienced postoperative improvement in pain and radicular symptoms. She was discharged the following day with plans to follow-up with Orthopedics and Rehabilitation as an outpatient.

At her initial Pediatric Rehab follow-up in June 2025, the patient was recovering well. She reported that gabapentin (400 mg daily) provided effective pain relief, but she self-weaned off this medication due to bothersome daytime drowsiness. On exam, MMT was notable for 4/5 strength in left hip flexors and left knee extensors; the remainder of the muscle groups in both legs demonstrated 5/5 strength. Her gait was antalgic with reduced weight-bearing on the left leg, but she was able to ambulate independently without use of assistive devices.

Following this visit, she was advised to begin physical therapy focusing on gait training and lower-extremity strengthening. The Rehab team discussed restarting a lower dose of gabapentin at night, but the patient declined due to concern over side effects. She was advised to use Tylenol or NSAIDs as needed for pain.

DISCUSSION

Current studies (1,9,10) indicate that adolescent patients have good-to-excellent outcomes after undergoing a discectomy/microdiscectomy for management of IVDH, regardless of approach or method of discectomy. There are few studies published specifically on nonoperative management of back pain in adolescent patients with IVDH. Guidelines for pediatric adolescents are often the same as they are for adults, but may have special considerations in this population.

Physical therapy in children and adolescents with IVDH has a similar structure to therapy in adults. It should focus on core and lumbar musculature strengthening, creating supervised exercise programs, improving range of motion and stretching, and training on posture/ergonomics (6,11).

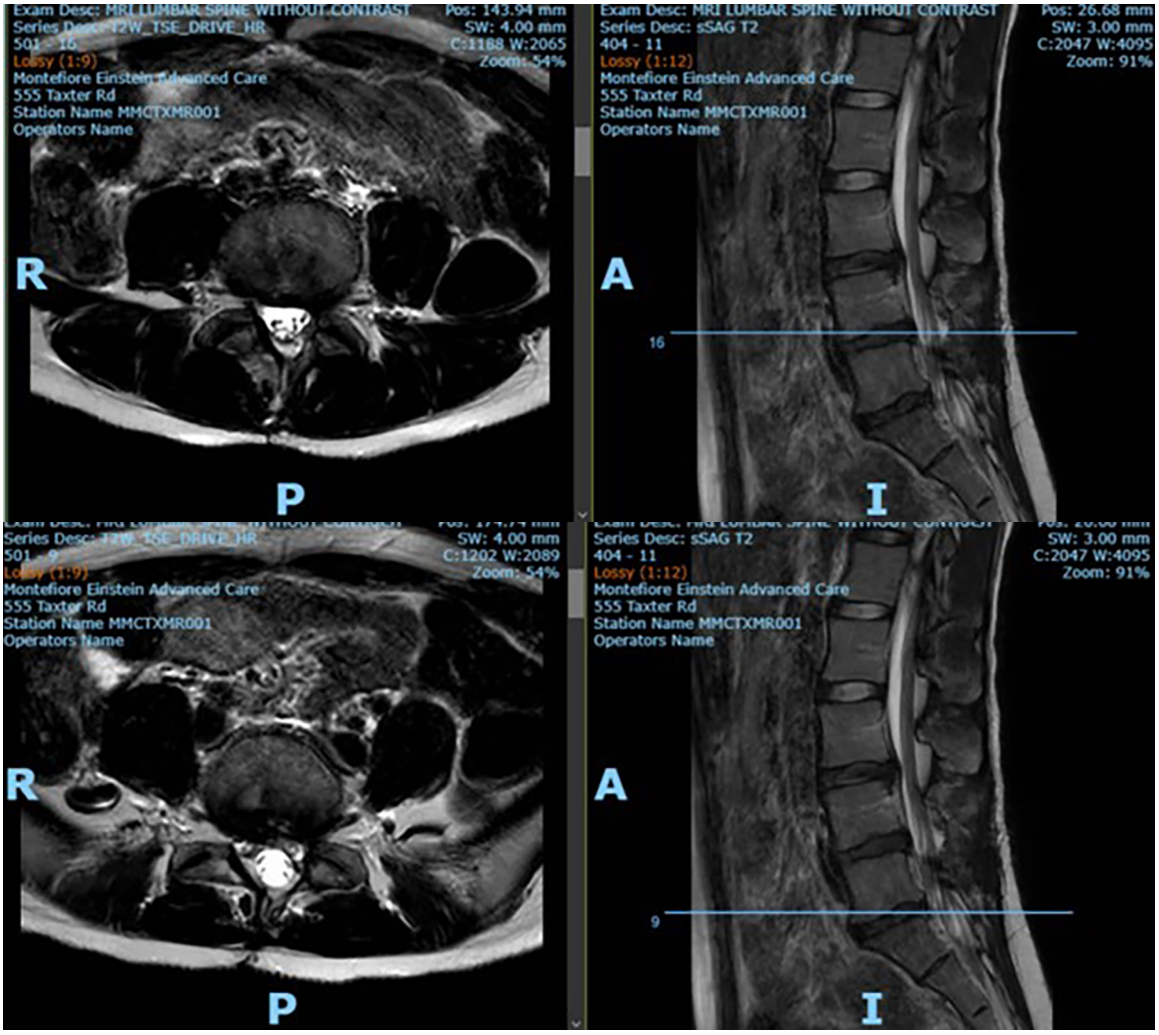

Fig. 3. Lumbar MRI from January 2025.

With respect to oral medications, it is preferable to use those with lower side effect profiles and less addictive potential (e.g., NSAIDs, Tylenol, gabapentin, duloxetine, tricyclic antidepressants, tramadol). Strong opioids (e.g., morphine, hydromorphone, oxycodone) are generally considered a last-line option for pharmacotherapy. Patients and their families must be counseled on risks associated with chronic opioid prescribing, as well as low-to-moderate-quality evidence for using chronic opioids in the management of back pain secondary to IVDH (12,13).

Regarding procedural intervention, current studies indicate a favorable safety profile, good acute pain relief, and improved functional status for adolescent patients that receive ESIs. There is currently insufficient evidence (14,15) to suggest ESIs provide improvement in chronic radicular back pain for patients of all ages. Children and adolescents also have a higher carcinogenic risk when exposed to ionizing radiation (such as that used in fluoroscopy) because juvenile tissue is more radiosensitive; therefore, avoiding excessive radiation exposure is emphasized (16). Furthermore, there is a higher lifetime cumulative risk of interventional complications (e.g., infection, hematoma, iatrogenic neurological damage) in children and adolescents compared to adults due to an increased aggregate of ESIs over several years (17).

A unique aspect of this case is that this young woman experienced multiple recurrent postoperative disc her-

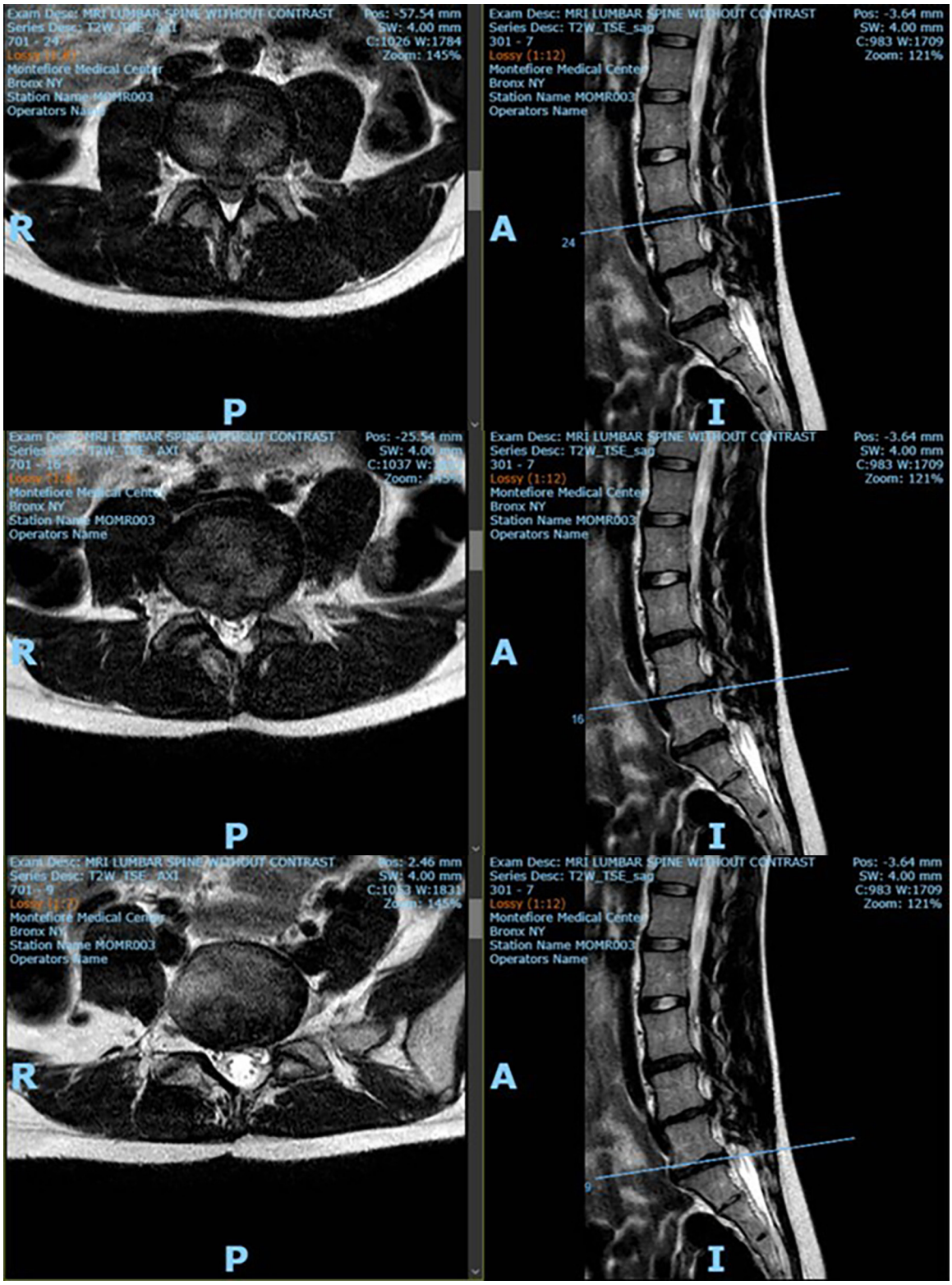

Fig. 4. Lumbar MRI from May 2025.

niations in the absence of identifiable inciting events. The current body of evidence (18,19) indicates that having 3 or more reherniations is vanishingly rare, and there are no large data series showing a measurable percentage of adolescent patients with this frequency of reherniation. After experiencing 4 overall IVDHs between the ages of 16 and 19, this patient's presentation is an extraordinary outcome.

It is notable that no high-quality pediatric-specific studies currently measure the effect of strict adherence to postoperative recovery recommendations on reherniation rates. Existing literature generally supports structured therapy, graded activity restrictions, and comprehensive pain management programs as good practice. Nevertheless, these studies do not stratify postsurgical reherniation by measured adherence to recovery protocols, lack standardized outcome definitions (e.g., radiographic recurrence vs symptomatic recurrence), and are limited by small sample sizes and potential bias (20-22). This patient's recurrent IVDHs occurred despite adhering to therapy recommendations, receiving multiple ESIs for pain management and to enhance therapy participation, and maintaining close postoperative follow-up with a surgeon.

Consequently, this patient's clinical outcomes, along with the current body of evidence, raise an important question: are current guidelines for conservative and surgical management of IVDH truly adequate for pediatric and adolescent populations? Given the circumstances of this case, it is reasonable to question whether adult treatment protocols are sufficient to optimize clinical outcomes in this cohort.

More research is needed to compare outcomes between adolescents and adults for these treatment modalities, and to develop and refine protocols specifically tailored for children with IVDH. In this context, it may be beneficial to create a registry for pediatric adolescents experiencing uncommon or unique spinal column pathologies. A centralized data hub would consolidate rare cases into a single database, enabling better identification of risk factors, clinical trends, and effective treatment protocols for pediatric and adolescent patients with IVDH.

CONCLUSIONS

This case highlights the unique challenges associated with managing IVDH in adolescent patients. Because this population has a longer life expectancy than adults, they are more likely to experience recurrent herniations over time. As a result, younger patients may trial more pain medications, undergo more frequent ESIs, and face a higher likelihood of undergoing multiple spinal surgeries compared to adult cohorts.

Future studies on adolescent IVDHs should focus on identifying the safest and most effective medications for managing low back pain and radicular symptoms, determining appropriate frequency and indications for ESIs in this population, and clarifying the role of discectomy and microdiscectomy in this population. Additionally, studies should compare treatment outcomes for these modalities between adolescent and adult populations. Only through such research can we hope to optimize care for younger individuals facing recurrent IVDH.

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