

CASE REPORT

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Treating external anal sphincter injury with platelet-rich plasma to resolve post-partum fecal incontinence caused by birthing trauma: A case report

Imran J Siddiqui, Jessica Probst, Sanjay Mahadevan,
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ABSTRACT

Introduction: Pelvic floor disorders following traumatic vaginal delivery of infants are common, with fecal incontinence (FI) as a clinically significant symptom. Injury to the external anal sphincter (EAS) is the likely culprit for this FI. Current standard-of-care options fall short of preventing long-term side effects and providing sustained quality-of-life improvements.

Case Report: We present the case of a 41-year-old female with a history of pelvic floor dysfunction and FI following childbirth. She presented to an outpatient regenerative medicine clinic and pelvic floor specialty clinic 15 months after symptom onset for a clinical evaluation and treatment due to difficulties with holding stool and activating her pelvic floor. Palpation-based pelvic mapping (PM), confirmed by trans-perineal pelvic ultrasound determined that the patient had significant injury to the EAS as well as damage to other pelvic floor soft tissues. The patient elected to undergo 2 rounds of ultrasound-guided platelet-rich plasma (PRP) injections directly to her EAS and other pelvic floor injuries. The patient completed 2 different validated patient-

reported outcome measure (PROM) surveys at various time intervals in her recovery to quantify her progress. Ultrasound images, PROM survey scores, and patient symptoms all indicated marked improvement and resolution of FI from baseline.

Conclusion: This case demonstrates the application of PRP to heal a significant EAS lesion, resulting in a resolution of the patient's FI. While more studies are required, PRP may potentially pose a safe and effective treatment with a lower risk profile than surgical alternatives for treating EAS injuries to resolve FI.

Keywords: Fecal incontinence, OASIs, Pelvic floor disorders, Platelet-rich plasma

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INTRODUCTION

Fecal incontinence (FI) is a problematic symptom that women with pelvic floor damage can experience after birthing injury. Current standard-of-care options to treat external anal sphincter (EAS) as a primary pathology appear to fall short of resolving fecal incontinence on their own. Clinically, we observe that these patients' general musculoskeletal birth injuries have typically been treated with pharmacologic agents [1], a pessary [2, 3], pelvic floor physical therapy (PFPT) [4], or an absence

of care altogether [5]. Each of these modalities has either medical risks of long-term adverse events or limitations in the amount of progress they can make to return a patient to near full function.

Platelet-rich plasma (PRP) is an orthobiologic and widely used treatment for traditional orthopedic musculoskeletal disorders [6] and is widely known to influence musculoskeletal healing through multiple growth factors [7, 8]. To date, there are no known studies or case reports that describe targeted, ultrasound-guided PRP injections to radiographic and palpable EAS defects as a treatment modality specific for FI in post-partum women. This case report describes a series of ultrasound guided PRP injections to ultimately heal a patient's frank EAS lesions and resolve their fecal incontinence.

CASE REPORT

A 41-year-old female with a 15-month history of pelvic floor dysfunction and fecal incontinence presented for a clinical evaluation and treatment at an outpatient regenerative medicine clinic. The patient had given birth 15 months prior to the initial visit and the delivery resulted in damage to the pelvic floor. The obstetrician who delivered the infant told the patient that she had 2 small tears inside the vagina and no perineal tearing, but the patient reported fecal urgency and difficulty holding formed stools after the delivery. In consulting with a certified pelvic floor physical therapy specialist, further pathologies were identified. The patient's fecal symptoms correlated with palpable defects at EAS and the puborectalis-external anal sphincter (PR/EAS) interdigitation. Further palpation revealed that the patient struggled with EAS and PR/EAS junction activation, especially on her right side. The patient also reported that her fecal incontinence also had global effects that related to other pelvic functions, such as pelvic floor tension, dyspareunia, and more frequent urinary tract infections (UTI). While there was other associated damage to the surrounding soft tissue of the pelvic floor, these were the patient's most significant injuries in correlating ultrasound images to her symptoms. Figure 1 depicts the ultrasound image of her EAS prior to any PRP treatment.

The patient was administered 2 different validated patient-reported-outcome-measure (PROM) surveys to further quantify and assess her overall pelvic floor dysfunctionality. Figures 2–4 display those scores at baseline, four months after her 1st PRP treatment, six months after her 1st PRP treatment (which was also two months after her 2nd PRP treatment), and eight months after her 1st PRP treatment (four months after 2nd PRP treatment). The PROMs used to quantify the patient's self-reported symptoms were the Pelvic Floor Impact Questionnaire (PFIQ-7), and the Pelvic Floor Disability Index (PFDI-20). The PFIQ-7, as seen in Figure 2, was given to the patient to measure the impact of her bowel, bladder, and vaginal symptoms on her general quality of life, while the PFDI-20, as seen in Figure 3, was

given to measure specific symptoms with regards to prolapse, bowel movements, and urination. We used the Colorectal-Anal distress inventory (CRAD-8) sub-scoring system of the PFDI-20 to further assess colorectal and FI symptoms, as seen in Figure 4.

The patient was consulted on treatment options including surgical intervention, continued conservative care, and regenerative treatment using PRP. The patient consented to and underwent 2 rounds of targeted PRP injections four months apart.

Both times, the patient's superficial skin was cleaned and swabbed using an alcohol pad. A total of 176 mL of whole blood was drawn and combined with 24 mL of Anticoagulant Citrate Dextrose Solution (ACDA) to prevent coagulation. The whole blood was subsequently processed via double-spin centrifugation to isolate a total of 16 mL of 8–12× concentrated leukocyte-poor PRP. Using a GE Logic E ultrasound and 12L broadband linear ultrasound transducer, the PRP injections were performed using an out-of-plane to transducer technique. A total of 3 mL of PRP was injected into the patient's EAS at each treatment, four months apart. Targets of injections were attained using pelvic floor physical therapist palpation to assist with US identification of the key areas of functional defects.

Both times the patient was discharged without complications. She was advised to avoid Aspirin and non-steroidal anti-inflammatory drugs (NSAIDs) for two weeks and use acetaminophen for pain relief instead. She was also advised to take a stool softener, avoid excessive physical exertion for two weeks, and have relative rest for two weeks prior to restarting PFPT.

In addition to the improved outcome scores on the validated inventory forms demonstrated in Figures 2–4, Figure 5 depicts the patient's healthy EAS with proper orientation and a return of the normal circular morphology at six months following the initial PRP treatment. Moreover, these findings were further confirmed by palpation-based pelvic mapping (PM) from a PFPT examination, determining increased tone and activation of the EAS and PR/EAS junction. Functionally, the patient reported full fecal continence, including with liquid stool, and fecal urgency improved to occurring no more than several times per month.

DISCUSSION

During the process of vaginal birth, an infant will pass through the vaginal canal and often create extensive damage to the soft tissue and musculature of the pelvic floor. Vaginal delivery is the primary cause of damage to the perineal muscles and EAS [9]. It has been reported that up to 23.7% of women manage at least 1 pelvic floor disorder in their lifetime with 9.0% of those women experiencing FI and an increasing percentage of women will experience a pelvic floor disorder based on the number of times they give birth, starting at 18.4% with primiparous women [10]. Furthermore, every year, up to

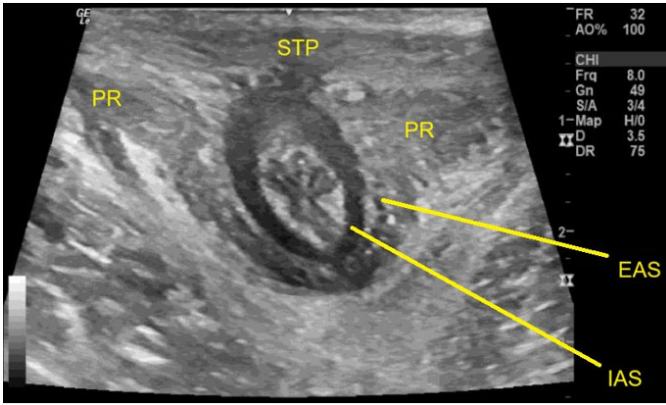


Figure 1: Ultrasound image of perineal adhesions causing ovoid deformity of the patient's external anal sphincter (EAS). The superficial transverse perineum (STP), puborectalis (PR) and internal anal sphincter (IAS) are labeled for anatomic clarity.

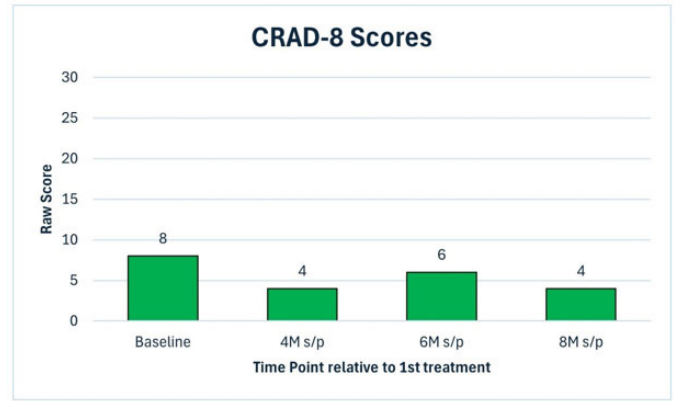


Figure 4: Colorectal-anal distress inventory 8 (CRAD-8) sub-score of the Pelvic Floor Disability Index (PFDI-20) for the patient at various time intervals, measuring specific symptoms related to anal incontinence symptoms.

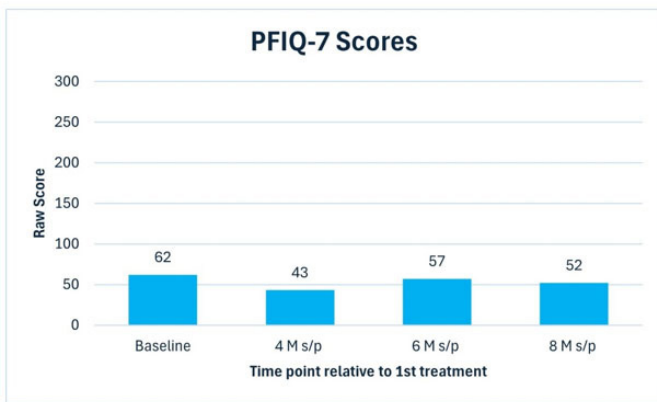


Figure 2: Pelvic Floor Impact Questionnaire (PFIQ-7) for the patient at various time intervals, measuring the impact of bowel, bladder, and vaginal symptoms on quality of life.

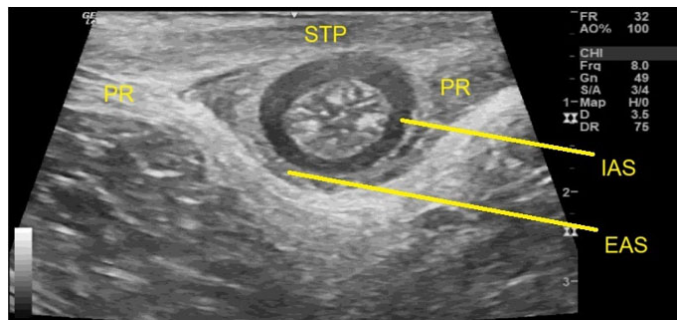


Figure 5: Ultrasound image of the patient's external anal sphincter (EAS) six months post-first PRP treatment showing return to proper circular morphology. Again, the superficial transverse perineum (STP), puborectalis (PR), and internal anal sphincter (IAS) are labeled for anatomic clarity.

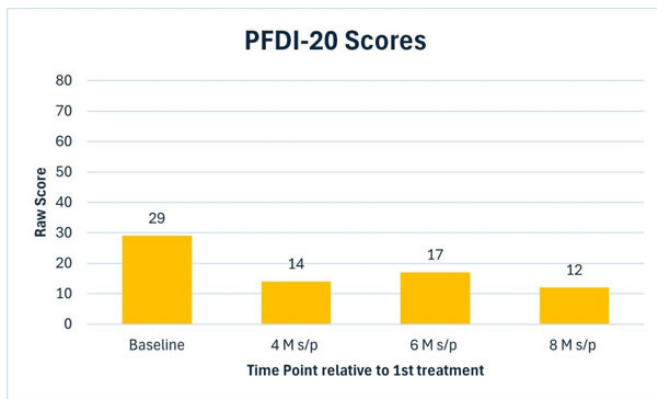


Figure 3: Pelvic Floor Disability Index (PFDI-20) for the patient at various time intervals, measuring specific symptoms related to urinary, fecal, and prolapse symptoms.

10% of women who give birth vaginally will have eventual surgery to address a pelvic floor disorder [11]. Moreover, between 0.5% and 17% of births result in obstetric anal sphincter injuries (OASIs) [9, 12] with the incidence of grade 2 tears being reported at 32% and the incidence

of grade 3 and 4 tears being reported at 1.6% of vaginal births [13]. It should be noted that when we refer to OASIs, we are focusing primarily on injury to the EAS and PR/EAS junction. The degree of OASIs injury can vary on an individual level. However, 3a and 3b OASIs defects are difficult to diagnose and it has been established that patients originally diagnosed with lower grade defects often actually have grade 3 defects that involve the EAS [14]. A systematic review recently reported that up to 37 treatments were examined in the treatment of FI following OASIs, with none of the treatments persistently improving outcomes [15]. Of note, two studies used the St. Mark's incontinence scale and the Cleveland-Clinic Scoring system to assess FI symptoms, but both agreed that several scoring systems with similar criteria have been proposed and used [9, 15]. Thus, we chose to use PFIQ-7 and PFDI-20 as endpoints due to their ability to assess other pelvic floor symptoms in addition to incontinence. The PFIQ-7 and PFDI-20 have strong application for women with pelvic floor disorders and are valid, reliable, and responsive short forms to also assess FI [16–18]. We also predicted this would improve patient compliance as it reduces the number of total PROMs and questions to complete for a given patient.

Traditional long-term sequelae from an absence of care can include but are not limited to: decreased sensation of the urogenital region, urinary incontinence, inadequate sexual experience, pelvic heaviness, hip and spine dysfunction, sacroiliac dysfunction, dyspareunia, or dysuria [19, 20]. Apart from the traditional long-term sequelae of these injuries, fecal incontinence is a symptom that has a profound impact in individuals with post-birth injury, especially with grade 3 and 4 perineal tears.

A meta-analysis of 6 case-control studies and 3 randomized controlled trials (RCT) investigated the use of PRP in the treatment of anal fistulas and determined that PRP was a safe and effective treatment [21]. This meta-analysis also detailed that the cure rate of PRP treatments of anal fistulas was 62.39% and an adverse event rate of 6.31%. The study compared the inclusion of PRP with surgery to only surgical methods and found that interventions involving PRP were superior to surgical-only methods. However, the applications of PRP in this meta-analysis are largely composed of PRP as a surgical adjunct. Future RCTs should investigate the efficacy of PRP injections alone to treat this pathology and other pelvic floor-related pathologies causally related to childbirth.

Multiple smaller studies have demonstrated that PRP is a safe and effective treatment for chronic anal fissures as well [22, 23]. Moreover, there is literature that agrees with the modality of diagnosis, given that endoanal ultrasonography and 2-dimensional ultrasonography are well correlated with each other and both are accurate, given that an experienced clinician is the administrator [24]. In 2024, there was a published prospective cohort study demonstrating the efficacy of using PRP to treat perianal sphincter injuries [25]. However, this study examined post-operative rectal cancer resection patients, while the case we present is the first use of PRP for fecal incontinence in the post-partum population. Additionally, the processing of PRP described in this study differs significantly from the processing and treatment using PRP for the patient presented in this case. Moreover, the patient presented in this case was advised to avoid using Aspirin and NSAIDs for 2 weeks and pain relief instead. Aspirin and NSAIDs inhibit platelet cyclooxygenase, thereby blocking the formation of thromboxane A₂, a platelet-activating and vasoconstricting eicosanoid, which inhibits normal platelet function in-vivo [26]. Overall, this case represents the first successful documented treatment of fecal incontinence with targeted PRP injections to the EAS from birth-related trauma.

This case is not without limitations. A patient's response to PRP has been documented to be affected by overall platelet dosage delivered to the target area [27]. A full hematology panel was not conducted for this patient with a cell-counting machine. Future studies should likely utilize these methods as a superior approach to further quantifying the therapeutic dosage of PRP required to heal certain tissues, like the EAS. This patient also participated in structured PFPT while recovering

from both rounds of PRP injections. While this patient had completed months of PFPT prior to PRP treatment without resolution of FI, it is not entirely clear how important PFPT as adjunct therapy was to the patient's overall clinical improvements. However, we hypothesize that PFPT as adjunct to PRP has the potential to produce superior quality-of-life outcomes than simply PRP injections alone.

CONCLUSION

From our observations in this case report, using high dose, targeted PRP injections to damaged EAS tissue can resolve fecal incontinence in birthing related injuries. This approach presents a decreased risk in comparison to surgical alternatives and is a promising treatment to those who fail other conservative measures. Furthermore, this case shows potentially significant benefits from using a team approach in the evaluation of birth injuries and identifying key targets for PRP injections both through PM by a qualified PFPT and trans-perineal US imaging by a physician specialist. This case represents the need for scientific reproduction of higher rigor, as several questions remain, particularly regarding total platelet dosage, the need to treat ancillary pelvic floor injuries, the importance for post-PRP PFPT, and the long-term outcomes for these injuries. These findings demonstrate that further research and formal study are warranted for the use of PRP for EAS tearing in postpartum women, but our results appear promising.

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Conflict of Interest

Authors declare no conflict of interest.

Data Availability

All relevant data are within the paper and its Supporting Information files.

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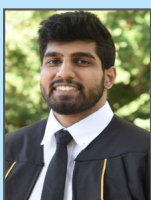
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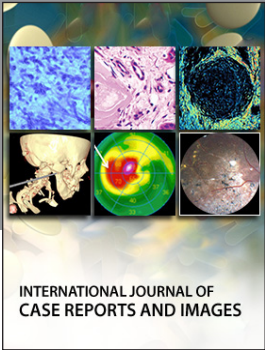
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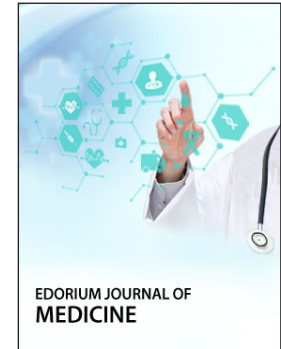
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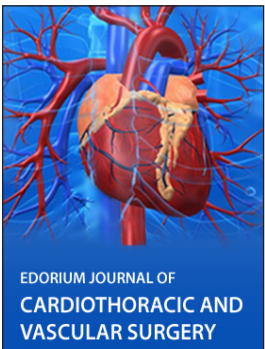
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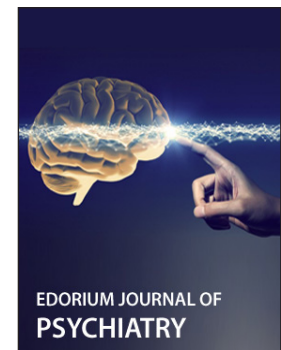
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