

World Journal of *Clinical Cases*

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ABOUT COVER

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Retrospective Study

Efficacy of Kegel exercises in preventing incontinence after partial division of internal anal sphincter during anal fistula surgery

Pankaj Garg, Vipul D Yagnik, Baljit Kaur, Geetha R Menon, Sushil Dawka

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Abstract

BACKGROUND

The transanal opening of intersphincteric space (TROPIS) procedure, performed to treat complex anal fistulas, preserves the external anal sphincter (EAS) but involves partial incision of the internal anal sphincter (IAS).

AIM

To ascertain the incidence of incontinence after the division of the IAS as is done in TROPIS and to evaluate whether regular Kegel exercises (KE) in the postoperative period can prevent incontinence due to IAS division.

METHODS

Patients operated on for high complex fistulas and having no preoperative continence problem (score = 0) were included in the study. All patients were operated on by the TROPIS procedure and were recommended KE (pelvic contraction exercises) 50 times/day. KE were commenced on the 10th postoperative day and continued for 1 year. Incontinence was evaluated objectively (by modified Vaizey's scores) in the immediate postoperative period (Pre-KE group)

and on long-term follow-up (Post-KE group). The incontinence scores in both groups were compared to evaluate the efficacy of KE.

RESULTS

Of 102 anal fistula patients operated on between July 2018 and July 2020 were included in this study. There were 90 males, the mean age was 42.3 ± 12.8 , and the median follow-up was 30 mo (18-42 mo). Three patients were lost to follow-up. There were 65 recurrent fistulas, 92 had multiple tracts, 42 had associated abscess, 46 had horseshoe fistula and 34 were supralelevator fistulas. All were magnetic resonance imaging-documented high fistulas ($> 1/3$ EAS involved). Overall incontinence occurred in 31% patients (Pre-KE group) with urge and gas incontinence accounting for the majority of cases (28.3%). The mean incontinence scores in the Pre-KE group were 1.19 ± 1.96 (in 31 patients, solid = 0, liquid = 7, gas = 8, urge = 24) and in the Post-KE group were 0.26 ± 0.77 (in 13 patients, solid = 0, liquid = 2, gas = 3, urge = 10) ($P = 0.00001$, *t*-test).

CONCLUSION

Division of the IAS led to incontinence, mainly urge incontinence, and also to a mild degree of gas and liquid incontinence. However, regular KE led to a significant reduction in incontinence (both in the number of affected patients and the severity of scores in these patients).

Key Words: Anal fistula; Incontinence; Urge; Transanal opening of intersphincteric space; Kegel exercises; Manometry

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Core Tip: This is the first study in which the incidence of fecal incontinence, especially urge incontinence, has been studied after an anal fistula procedure that involves division of only the internal anal sphincter and sparing of the external anal sphincter. Overall incontinence occurred in 31% of patients in the postoperative period. Urge and gas incontinence accounted for the majority of incontinence cases (28.3%). The benefits of Kegel exercises (KE) in reversing fecal incontinence have been highlighted for the first time. KE initiated early in the postoperative period reversed incontinence in a significant majority of patients. Even in patients with residual incontinence, the severity of incontinence became significantly reduced.

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INTRODUCTION

Several procedures in vogue are performed all over the world to treat anal fistulas and anal fissures[1-5]. Some of these surgical procedures entail the partial division of the external anal sphincter (EAS), the internal anal sphincter (IAS), or both[3,6-8]. The procedures which involve partial division of only the IAS are lateral internal sphincterotomy (LIS) for anal fissures and transanal opening of intersphincteric space (TROPIS) procedure for complex high anal fistulas[2,8-11]. The EAS is completely spared in these procedures. It is believed that since the EAS is primarily responsible for maintaining continence, selective partial division of the IAS would not significantly impact continence[12,13].

However, a large meta-analysis highlighted that long-term continence disturbance after LIS for anal fissures was higher than expected[11]. Incontinence occurred in 14% of patients (9% flatus, 6%-seepage/soiling and 0.9%-accidental bowel motion)[11]. Surprisingly, urge incontinence was not reported in most of the studies[11]. Moreover, most scoring systems have neither included nor given any scores or importance to urge incontinence[14-17]. Only Vaizey's scoring system had included urge incontinence as a parameter[18].

The IAS is primarily responsible for maintaining resting anal pressures. Division of the IAS leads to a decrease in resting anal pressure. Usually, the anal canal is free of fecal matter and only when the IAS relaxes during defecation does feces enter the anal canal. The human mind is tuned to associate the presence of fecal matter in the anal canal with the impending passage of feces. Therefore, in patients with a divided IAS and decreased resting anal pressure, feces, when present in the lower rectum, passes

unrestricted into the anal canal, giving the feeling that ‘feces is about to pass out of the anus’ (urge incontinence). We were seeing urge incontinence regularly in patients undergoing the TROPIS procedure[9]. Therefore, we prescribed Kegel exercises (KE) to all of our post-operative patients as a protocol. Since only Vaizey’s scoring system had urge incontinence as a parameter, this system was utilized.

KE, also known as pelvic floor muscle exercises or pelvic floor muscle training, are a non-invasive and safe behavioral treatment method shown to be effective for the prevention and treatment of urinary incontinence[19,20]. KE entails repeated, selective, and voluntary contraction and relaxation of the EAS, pubococcygeus and levator ani muscles[21]. The contraction and relaxation phases have to last at least 3-5 s each for the exercises to be effective[19]. KE strengthens the pelvic floor muscle group, enhances the pelvic floor muscle tone by increasing urethral muscle contraction and consequently helps to prevent urinary incontinence[22]. However, the effect of KE on the prevention of fecal incontinence has not been studied. We could not find any study in which the efficacy of KE has been analyzed after anal fistula surgery.

The incidence of incontinence after the division of the IAS (TROPIS procedure) and whether regular KE in the postoperative period could prevent incontinence after IAS division was evaluated in this study.

MATERIALS AND METHODS

In this retrospective study, all consecutive patients operated on for high complex anal fistulas between July 2018 and July 2020 and having no continence problem (modified Vaizey’s score = 0) preoperatively were included in the study. Indus International Hospital-Institute Ethics Committee approved the study. The patients were informed about the purpose of the study, written consent was taken and the study was conducted in accordance with the Declaration of Helsinki.

Preoperative magnetic resonance imaging (MRI) was done on every patient and all of the fistulas were documented to be high (involving > 1/3 of EAS) on MRI. The patients were operated on by the TROPIS procedure[2,8-10] and were recommended KE 50 times *per* day from the 10th postoperative day onwards. In the TROPIS procedure, the postoperative pain settled to a large degree by the 10th postoperative day. Due to this reason, the patients were able to resume all of their normal activities by the 10th postoperative day and were also able to do KE (50 times *per* day) without any difficulty. Therefore, the 10th postoperative day was chosen as the time to evaluate baseline continence. KE were continued for 1 year after surgery.

Incontinence was evaluated objectively (modified Vaizey’s scores) (Table 1). The scoring was done once in the immediate postoperative period on the 10th day after surgery before the commencement of KE (pre-KE group) and on long-term follow-up at 18 mo after surgery (post-KE group). The incontinence scores in both groups were compared to evaluate the efficacy of KE.

Modified Vaizey’s scores

In the original Vaizey’s scoring method, there were six parameters- incontinence to solid, liquid and gas (0-4 scores), alteration in lifestyle (0-2 scores), need to wear a pad (0-2 scores) and urge incontinence (0-4 scores)[18]. The original Vaizey’s scores had only two score categories for urge incontinence (no = 0, yes = 4)[18]. The minimum score was zero (no incontinence) and maximum possible score was 24 (total incontinence)[18]. In the modified Vaizey’s scores, the only change made was addition of categories for urge incontinence (never = 0, rarely = 1, sometimes = 2, weekly = 3, daily = 4) (Table 1).

TROPIS

TROPIS is a sphincter-sparing procedure (saves the EAS) performed to manage complex anal fistulas. It has been shown to be > 85% effective to heal complex anal fistulas[2,8-10,23]. In this procedure, through the transanal route, an artery forceps is inserted through the internal opening into the fistula tract present in the intersphincteric plane. The mucosa and the internal sphincter over the artery forceps are incised and its edges are trimmed with electrocautery. Thus, the intersphincteric space is laid open (deroofed) into the anal canal. This wound is left open to heal by secondary intention[2,8-10,23]. The fistula tract lateral (external) to the EAS can be managed by any method convenient to the surgeon (excision of the tract or laser ablation of the tract or curettage of the tract with insertion of a drainage tube). The TROPIS procedure has been shown to have the highest cure rate in complex anal fistulas among all sphincter-preserving procedures[23].

KE

As a protocol, patients were taught KE during the first consultation with the operating surgeon before the surgery. The exercise was explained thus: “Please squeeze the anus as if you are trying to stop passing of flatus or passage of urine in midstream or you have to pull in an imaginary coin placed at the anus. The squeeze or contraction has to be held for at least 5 s and then released. After 5 s of relaxation, this process has to be repeated” Then, during the routine per-rectal examination (as part of the local

Table 1 Modified Vaizey's incontinence scores

Factor	Never	Rarely	Sometimes	Weekly	Daily
Incontinence for solid stool	0	1	2	3	4
Incontinence for liquid stool	0	1	2	3	4
Incontinence for gas	0	1	2	3	4
Alteration in lifestyle	0	1	2	3	4
Need to wear a pad	No = 0 Yes = 2				
Taking constipating medicines	No = 0 Yes = 2				
Urge incontinence (inability to defer defecation by 15 min)	0	1	2	3	4

Never: No episodes in the past 4 wk; Rarely: 1 episode in the past 4 wk; Sometimes: > 1 episode in the past 4 wk but < 1 a week; Weekly: ≥ 1 a week, < 1 daily; Daily: ≥ 1 a day. In Vaizey's scores, Urge incontinence had only two categories (no = 0, yes = 4). In modified Vaizey's scores, Urge incontinence was given five score categories (0-4) as shown in the table above.

fistula examination), the patient was told to do the explained KE while the surgeon's finger was inside the anus. This way, the strength of the sphincter-complex as well as the correctness of doing KE was checked. After this, the finger was withdrawn from the anus and the correctness of the patient doing KE was again checked by visual inspection. The patient was again told to perform KE and the contraction of sphincter muscles was checked visually by observing inward retraction of the anus. It was reemphasized that the contraction has to be held for at least five seconds.

The patients were told the purpose and benefits of doing KE. They were cross-checked and motivated at every postoperative visit and follow-up on the telephone or social media (WhatsApp) as to whether they were doing KE or not. Certainly, it was not easy as many patients tend to miss doing KE for different reasons (forget doing, difficult to do, doing exercises is boring, *etc*). But, persistence and patience on part of the surgical team were pivotal to achieve the desired results. And to ensure compliance of the patients, an individual WhatsApp group was made for every patient in which the patient and members of the operating team including the surgeon were there. The patient was instructed to confirm in the WhatsApp group whether he/she had done KE that day on a daily basis. The patients who didn't do KE or forgot to post in the WhatsApp group were given a reminder. This method was found to be extremely effective in ensuring compliance.

Statistical analysis

The categorical variables were compared by performing chi-square or Fisher's exact test. In the data, which was normally distributed, the continuous variables were tested by Student's t-test when there were two samples and the ANOVA test was performed when there were more than two samples. In the data which was not distributed normally, Wilcoxon signed rank test was performed for paired samples and Mann-Whitney U test was applied for unpaired samples. The significant cut-off point was set at $P < 0.05$.

RESULTS

Of 102 consecutive patients with complex anal fistula and operated on between July 2018 and July 2020 with no preoperative incontinence (modified Vaizey's score = 0) were included in the study. There were 90 males, the mean age was 42.3 ± 12.8 years and the median follow-up was 30 mo (18-42 mo) (Table 2). 3 patients were lost to follow-up. All fistulas were high (involving > 1/3 of EAS). There were 65 recurrent fistulas, 92 had multiple tracts, 42 had associated abscesses, 46 had horseshoe fistulas and 34 were supralelevator fistulas (Table 2). As *per* Parks classification, 8 patients had grade I, 61 patients had grade II and 33 patients had grade III fistulas. None had grade IV fistula.

Incontinence scores

Total incontinence scores: The mean total incontinence scores in the pre-KE group were 1.19 ± 1.96 (in 31 patients) and in the post-KE group were 0.26 ± 0.77 (in 13 patients) ($P = 0.00001$, *t*-test) (Table 3).

Table 2 Patient parameters

Parameter	Data, n = 102
Age	42.3 ± 12.8
Males	90 (88.2)
Follow-up, median (range), mo	30 (18-42)
Fistula characteristics	
High	102 (100)
Recurrent fistulas	65 (63.7)
Multiple tracts	92 (90.2)
Associated abscess	42 (41.7)
Horseshoe fistula	46 (45.1)
Supralevator fistulas	34 (33.3)
Parks classification	Grade I-8
	Grade II-61
	Grade III-33
	Grade IV-0

Data are presented as n (%), unless otherwise indicated.

Table 3 Overall incontinence

n = 99	Immediate postoperative (before Kegel exercises)	Long-term (after Kegel exercises)	P value
Number of patients	31	13	0.00001, t-test
Total score	118	26	
Mean score	1.19 ± 1.96	0.26 ± 0.77	

The distribution of incontinence in 31 patients in the pre-KE group was solid = 0, liquid = 7, gas = 8, urge = 24 (Table 4) and in the post-KE group was solid = 0, liquid = 2, gas = 3, urge = 10.

Thus, incontinence occurring in the pre-KE group was 31.3% which was reduced to 13.1% in the post-KE group. More importantly, the mean score also reduced significantly from 1.19 to 0.26 and the total scores in the groups decreased markedly from 118 to 26 (Table 3).

Urge incontinence: The mean urge incontinence scores in the pre-KE group were 0.88 ± 1.62 (in 24 patients) and in the post-KE group were 0.20 ± 0.66 (in 10 patients) ($P = 0.00007$, t-test) (Table 5).

Thus, urge incontinence was quite common and occurred in almost one-fourth (24.2%) of the patients after surgery (pre-KE group). With KE, the incidence reduced to 9%. The total score also decreased markedly from 88 to 20 (Table 4), thereby indicating that not only the number of affected patients decreased significantly but the severity of incontinence also was reduced drastically (Table 5).

Gas incontinence: The mean scores in the pre-KE group were 0.16 ± 0.60 (in 16 patients) and in the post-KE group were 0.04 ± 0.24 (in 4 patients) ($P = 0.03$, t-test) (Table 5).

Gas incontinence occurred in 16.1% of patients in the pre-KE group which was reduced to 4% with KE. The total scores also decreased considerably from 16 to 4 (Table 5).

Liquid incontinence: The mean scores in the pre-KE group were 0.14 ± 0.58 (in 7 patients) and in the post-KE group were 0.02 ± 0.14 (in 2 patients) ($P = 0.03$, t-test) (Table 5).

Liquid stool incontinence occurred in 7% of patients in the pre-KE group which was reduced to 2% with KE. The total score decreased considerably from 14 to 2 (Table 5).

Solid incontinence: Incontinence to solid stools did not occur in any patient.

Male vs female: The incidence of incontinence was higher in males (33.3%) as compared to females (16.7%), but this was not significant ($P = 0.33$, Fisher's exact test) (Table 6). The total scores and the mean incontinence scores were also not significantly different (Table 6).

Table 4 Distribution of incontinence types in affected patients

Type of incontinence	Total patients, <i>n</i> = 31 (urge = 24, gas = 8, liquid = 7, solid = 0)
Urge	19
Gas	2
Liquid	3
Urge + gas	3
Urge + liquid	1
Gas + liquid	2
Urge + gas + liquid	1
Total	31

Table 5 Sub-group analysis

<i>n</i> = 99		Immediate postoperative (before Kegel exercises)	Long-term (after Kegel exercises)	<i>P</i> value
Urge	Number of patients	24	10	0.00007, <i>t</i> -test
	Mean scores	0.88 ± 1.62	0.20 ± 0.66	
	Total score	88	20	
Gas	Number of patients	8	3	0.03, <i>t</i> -test
	Mean scores	0.16 ± 0.60	0.04 ± 0.24	
	Total score	16	4	
Liquid	Number of patients	7	2	0.03, <i>t</i> -test
	Mean scores	0.14 ± 0.58	0.02 ± 0.14	
	Total score	14	2	
Solid	Number of patients	0	0	

Table 6 Males vs females

<i>n</i> = 99		Males, <i>n</i> = 87	Females, <i>n</i> = 12	Significance, <i>P</i> value
Patients		29 (33.3%)	2 (16.7%)	0.33, Fisher exact test
Total scores	Immediate postoperative (before Kegel exercises)	112	6	0.59, Fisher exact test
	Long-term (after Kegel exercises)	26	0	
Mean scores	Immediate postoperative (before Kegel exercises)	1.28 ± 2.0	0.5 ± 1.24	0.09, <i>t</i> -test
	Long-term (after Kegel exercises)	0.29 ± 0.82	0	

DISCUSSION

The results of the study highlighted that the incidence of incontinence, especially urge incontinence and gas incontinence, were high after the partial division of the IAS as was done in the TROPIS procedure. Urge plus gas incontinence occurred in 28.3% (28/99) patients and accounted for the majority of incontinence in the cohort (Table 4). But the encouraging point was that KE was remarkably effective in reversing incontinence in the majority of patients (Tables 3 and 5). The number of affected patients reduced from 31.3% to 13.1% after doing KE (Table 3). An equally important point that needs to be highlighted was that the severity of incontinence in the residual group (post-KE group) was significantly lower, with mean scores decreasing from 1.19 to 0.26 (Tables 3 and 5). Thus, KE can reverse or prevent incontinence significantly after the division of the IAS. This is the first study that has investigated the incidence of urge incontinence after the division of the IAS. The efficacy of KE in reversing or preventing fecal incontinence has also been reported for the first time in a large cohort that had a fairly long follow-up. Also, all the patients had MRI-documented high fistulas.

KE has been shown to be effective in preventing urinary incontinence after prostate surgery and after delivery[19-22,24]. But the efficacy of KE has not been studied in fecal incontinence after anal fistula surgery. In urinary incontinence, the timing of doing KE has also been shown to be relevant. The beneficial effects of KE to prevent urinary incontinence are best when the KE are initiated before surgery or immediately after surgery[25]. This seems logical because once fibrosis sets in the damaged sphincter muscles, muscle strengthening by exercises becomes difficult. In the present study too, the KE were taught and the patients were advised to initiate them in the preoperative period, though the exercises were meticulously recommended in the immediate postoperative period. This could be the reason for the significant benefits of KE seen in this study.

The importance of teaching the right method of KE cannot be understated. In our experience, only verbally explaining the exercises could not be relied upon as many patients were not able to perform KE only on verbal explanation. We found that the methods explained above (patient performed KE and its correctness checked by inserting a finger inside the anus and visual inspection of inward retraction of the anus) were quite effective and should be routinely employed by surgeons.

As mentioned above, the effort to get KE done regularly by the patients required a lot of persistence, patience and dedication on behalf of the surgical team. It was not a one-time task. Teaching of the right method of doing KE and explaining the benefits of performing the exercises was only the 'small' first step. The patients had to be motivated, reminded and even 'hammered' at every opportunity (in every postoperative visit and follow-up) to perform KE regularly. We utilized social media (WhatsApp) quite effectively to achieve this. The patients who were not very compliant were identified. In the first month, they were recommended to do KE fifty times *per* day and then post the update on WhatsApp on a daily basis. Though cumbersome for the surgical team, we feel that the strategy proved effective.

Urge incontinence after anorectal surgery has been largely ignored and not given its due importance. Urge incontinence is quite distressing to the patient. This is quite so in Indian patients who pass frequent bulky stools because of the higher prevalence of a vegetarian diet and very few studies have reported urge incontinence after anal fistula surgery. Even so, most of the scoring systems have not included or given any scores or importance to urge incontinence[14-17]. Only Vaizey's scoring system had included urge incontinence as a parameter[18]. We found urge incontinence in many of our patients in the postoperative period and therefore used Vaizey's scores. However, in Vaizey's scores, the urge incontinence had been allotted only two scores (zero for no urge incontinence and four for the presence of urge incontinence). As we found different grades of severity of urge incontinence and also to objectively evaluate the beneficial impact of KE, the grading of urge incontinence was very important. For this reason, Vaizey's scores had to be modified a bit and five different scores were allotted to urge incontinence as was done for other incontinence (gas, liquid, and solid incontinence) in the original scoring system (Table 1).

Another procedure that entails division of only the IAS (and spares the EAS) like TROPIS is LIS, done for acute and chronic anal fissures[11,26]. A large meta-analysis which evaluated incontinence after LIS found incontinence in 14% patients (flatus IC in 9%, seepage/soiling in 6% and accidental bowel motion in 0.9%)[11]. These results are quite similar to the reported rates of incontinence in the present study (incontinence in 12%, flatus incontinence in 8% and liquid incontinence in 7%). This is not unexpected as both LIS and TROPIS are comparable procedures (the IAS is partially divided whereas the EAS is completely spared).

The study has limitations. It was a retrospective study. There was no control group, the presence of which would have increased the credibility of the study results. We did attempt to make a control group but couldn't do so as none of the patients agreed to be a part of the control group. During the informed consent, on being explained that not doing KE could increase the risk of incontinence, every patient preferred to be in the study group. Therefore, the idea of making a control group was dropped. Due to retrospective design, it was not possible to have a causative conclusion and this could be more of an association rather than causation. However, the main value of this study was that it has highlighted the idea that KE in the postoperative period could perhaps help reverse incontinence due to IAS damage and only prospective controlled studies in the future would be able to establish the causation. Lastly, though incontinence was evaluated by a detailed objective scoring system, the addition of anal manometry (preoperative and on long-term follow-up) would have added value to the study.

CONCLUSION

To conclude, this is the first study in which the incidence of fecal incontinence, especially urge incontinence, has been studied after a fistula procedure which entails division of only the IAS. Incontinence was found to affect 31% patients in the postoperative period. Urge and gas incontinence accounted for the majority of incontinence cases (28.3%). KE initiated early in the postoperative period reversed incontinence in a significant majority of patients. Even in patients with residual incontinence, the severity of incontinence became significantly reduced. Further prospective controlled studies, preferably randomized, are required to corroborate the results of this study.

ARTICLE HIGHLIGHTS

Research background

Certain surgical procedures utilized to treat complex anal fistulas entail partial division of the internal anal sphincter (IAS). The impact of partial division of IAS on continence is not well known.

Research motivation

One of the latest and most effective procedures for complex anal fistulas is the transanal opening of intersphincteric space (TROPIS) procedure which also involves partial incision of the IAS.

Research objectives

The objective was to ascertain the incidence of incontinence after the division of IAS as is done in the TROPIS procedure and to evaluate whether regular Kegel exercises (KE) in the postoperative period can prevent incontinence due to IAS division.

Research methods

Patients with high complex fistulas who were operated on using the TROPIS procedure were recommended KE for 1 year after surgery. The impact of KE was then evaluated in preventing incontinence after surgery.

Research results

Of 102 patients with complex anal fistula who were operated on between July 2018 and July 2020 were included in this study. Overall incontinence occurred in 31% of patients (before doing KE) with urge and gas incontinence accounting for the majority of cases (28.3%). The mean incontinence scores in the patients (before doing KE) were 1.19 ± 1.96 . After doing KE regularly, the incontinence remained in only 13% of patients with mean scores decreasing to 0.26 ± 0.77 . This improvement in continence was statistically significant ($P = 0.00001$, *t*-test).

Research conclusions

The partial division of IAS during anal fistula surgery led to incontinence which was mainly urge incontinence and also to a mild degree of gas and liquid incontinence. However, regular KE led to a significant reduction in incontinence.

Research perspectives

This study would propel further research to evaluate the importance of KE in preventing incontinence after anal surgery.

FOOTNOTES

Author contributions: Garg P conceived and designed the study, collected and analyzed the data, revised the data, finally approved and submitted the manuscript (Guarantor of the study); Yagnik VD and Kaur B collected the data; Yagnik VD, Kaur B and Menon GR analyzed the data, revised the data, finally approved and submitted the manuscript; Dawka S critically analyzed the data, reviewed and edited the manuscript, finally approved and submitted the manuscript.

Institutional review board statement: The study was reviewed and approved by the Indus International Hospital-Institute Ethics Committee (IIH-IEC), No. EC/IIH-IEH/SP6.

Informed consent statement: All study participants, or their legal guardian, provided informed written consent prior to study enrollment.

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