Original Article

Transabdominal Repair of Vesicovaginal Fistulae: A 10-Year Tertiary Care Hospital Experience in Nigeria

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Abstract

Background: Vesicovaginal fistula (VVF) is still a major cause for concern in many developing countries. Arguments continue as to the best approach for repair. This study aimed to present our experience with transabdominal VVF repair. **Subjects and Methods:** This was a 10-year retrospective review of transabdominal VVF repair. Important data extracted from the case notes included patients' demography, aetiology, previous repair, operative findings, procedures and treatment outcome. Data were analysed using SPSS version 21. Bivariate analysis of factors affecting treatment outcome was carried out with the level of significance set at $P < 0.05$. **Results:** Fifty-three VVF repairs were carried out in 51 patients. Mean age was 29.8 ± 15.4 years. Forty-five (84.9%) had previous repairs. The aetiologies of VVFs were prolonged obstructed labour in 41 (80.4%) and post-operative in 10 (19.6%). Forty-one repairs were through a transperitoneal transvesical approach whereas 12 had an extraperitoneal transvesical approach. The fistulae diameter ranged from 0.3 to 2.8 cm with an average of 1.64 cm. Six had ureteric re-implantation; (bilateral in two patients). Repair was successful in 47 (88.7%) cases, which translated to the overall success rate of 92.1% in the 51 patients treated. Success rate was higher (95.6%) for the subset of patients who had previous transvaginal repairs. Catheter blockage in the post-operative period was a significant factor that had effect on outcome ($P < 0.015$). **Conclusion:** Transabdominal repair recorded an excellent result in patients who had previously failed transvaginal repairs and may be considered as the first option in these patients.

Keywords: Repair, transabdominal, transvaginal, treatment outcome, vesicovaginal fistula

Introduction

Vesicovaginal fistula (VVF) is the most common kind of acquired fistulae of the urinary tract.[1] It remains a major cause for concern in many developing countries. Estimates suggest that at least three million women in poor countries have unrepaired VVFs and that 30,000–130,000 new cases develop each year in Africa alone.[2] It is a debilitating condition that has affected women for millennia and has since continued to plague humanity though the incidence has reduced significantly globally.[3] Although not a life-threatening condition, VVF is a serious medical problem due to its numerous psychosocial consequences.[4]

The exact incidence or prevalence of VVF in Nigeria is not known. As a matter of fact, most authors documented the problem of inaccurate data. It is however estimated that about 800,000–1,000,000 women are awaiting repair.[5] As in most third world countries, most women acquire it while performing their legitimate obstetric function.[6]

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Various approaches to VVF repair have been described, and arguments continue regarding the best route for repair. Repair can be transvaginal or transabdominal. Transabdominal repair can also be transperitoneal or extraperitoneal transvesical. Combined abdominal and vaginal approach has also been described. Whichever technique is used, the aim of treatment is to stop urine leakage and enable recovery of urinary and genital functions. Current trend favours transvaginal approach in simple fistulae. The usefulness and limitations of this approach are however well defined.[7,8] This study depicts our experience with transabdominal repair of VVF in our centre over a 10-year period.

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Subjects and Methods

This was a 10-year retrospective review of all patients who had transabdominal VVF repair in the urology unit of the Department of Surgery, Lagos University Teaching Hospital (LUTH), Lagos. LUTH is a tertiary teaching hospital, which offers both urological and gynaecological services. Health research and ethics committee of the hospital approved this review with reference number ADM/DSCT/HREC/APP/2170. The study period covered January 2008 to December 2017. These patients were referred for VVF repair from various private hospitals, state general hospitals and gynaecology clinics. All cases of isolated ureterovaginal fistulae (UVF) during the study period were excluded. The cases were traced using clinic, ward and theatre records. The clinical and operative details of these patients were retrieved and analysed. Clinical information extracted from the records included patients' demography, the source of referral, aetiology and duration of the fistula as well as duration before repair, history of previous operative repair, intra-operative findings and procedures performed. Other clinical data retrieved were post-operative management, complications and outcome of treatment. Primary, secondary, tertiary and quaternary repairs refer to the first, second, third and fourth attempts at repair of fistulae, respectively. All patients had transabdominal repair through a sub-umbilical mid-line incision within supine position. All procedures were performed under general anaesthesia. Details of the procedures carried out in all patients irrespective of approach, whether transperitoneal or extraperitoneal, were cystostomy, identification of fistulae, anatomical separation of the bladder from the vagina, excision of fistula tract, multi-layered repair of fistulae, catheter insertion and two-layered closure of bladder incision. Urine drainage was either by the suprapubic catheter in addition to a urethral catheter or simply by a 3-way urethral catheter. The urethral catheter was anchored similar to Malament suture with a non-absorbable suture attached to the tip of the catheter through the bladder and the anterior abdominal wall on either side, tied on the skin to elevate the catheter balloon slightly from the repair site. Catheter was removed between 2 and 4 weeks after repair. Successful repair is defined as cessation of continuous leakage of urine after removal of catheter the following repair while a failed repair connotes continued leakage of urine following catheter removal after repair. Overall success rate is the percentage of all patients who had successful repair after all repairs undertaken in our unit. Data were analysed using Statistical Package for the Social Sciences for Windows Version 21.0 (IBM Armonk, NY, USA). Bivariate analysis of factors thought to affect the success of repair was carried out with the level of significance set at $P < 0.05$.

Results

A total of 57 transabdominal VVF repairs were performed over the 10-year study period. These repairs were carried out in 55 patients as two had repairs twice for failed initial repair. Of these 55 patients, 4 were excluded for incomplete data. Data from only 53 repairs performed in 51 patients were adequate and therefore analysed.

The age range of patients was 17–57 years with a mean of 29.8 ± 15.4 years. The average duration of fistulae before presentation and repair were 31.3 and 57.1 months, respectively. Twenty-four (47.1%) were full-time housewives whereas 15 (29.4%) were petty traders. Only 21 (41.2%) of these women had more than primary education. Eighteen (35.3%) of the affected women were either divorced or separated or abandoned [Table 1]. Thirty-five (83.3%) and 7 (15.5%) repairs were transvaginal and transabdominal, respectively, whereas three (6.7%) of the four with three previous repairs had both transvaginal and transabdominal repairs.

The causes of VVF in our patients were obstetric in 41 (80.4%) and post-operative in 10 (19.6%) patients. There were no malignant or radiation fistulae [Figure 1]. Of the obstetric fistulae, thirty-seven (90.2%) resulted from prolonged obstructed labour with subsequent vaginal deliveries while 4 (9.8%) were from emergency caesarean section (C-section) for failed vaginal delivery after prolonged obstructed labour. The mean duration of labour was 2.1 ± 1.5 days. Twenty-seven (65.9%) of these women lost their babies either at deliveries or in early neonatal period.

All patients presented with a history of continuous leakage of urine per vaginam. They all noticed leakage of urine within 2 weeks of exposure to the aetiological agents.

Table 1: Characteristics of the 51 patients at presentation

Variable	Frequency, *n* (%)
Duration before presentation (months)	
0-6	23 (45.1)
>6-12 months	14 (27.5)
1-5 years	9 (17.6)
>5 years	5 (9.8)
Occupation	
Full-time housewife	24 (47.1)
Petty trader	15 (29.4)
Civil servants	12 (23.5)
Marital status	
Single/never married	5 (9.8)
Married	26 (51.0)
Divorced/abandoned/separated	18 (35.3)
Widow	2 (3.9)
Educational status	
No formal education	18 (35.3)
Primary	12 (23.5)
Secondary	15 (29.4)
Tertiary	6 (11.8)
Point of referral	
Private hospitals	19 (37.3)
General hospitals	15 (29.4)
Gynaecology clinics	17 (33.3)
History of previous repairs	
No previous repair	8 (15.7)
1 previous repair	26 (51.0)
2 previous repairs	13 (25.5)
3 previous repairs	4 (7.8)

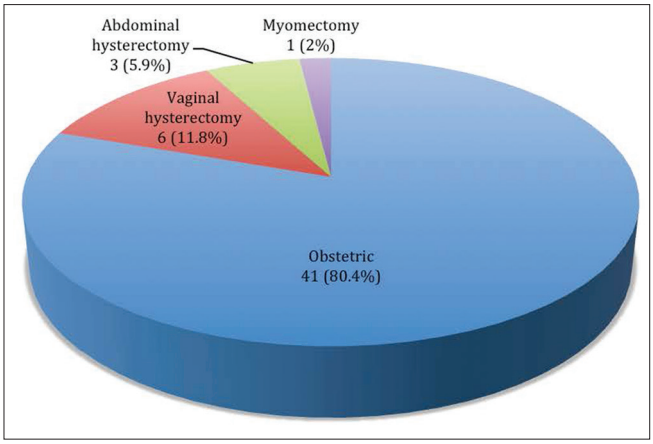

Figure 1: Aetiologies of vesicovaginal fistulae

Eight (15.7%) patients still had feeling of bladder fullness. Urine microscopy, culture and sensitivity were carried out routinely in all patients. All had combined intravenous urogram and cystography requested, but results were documented in only 41 patients. Demonstration of the cup and saucer appearance was noted in only 25 (49.0%), leakage of contrast in 19 (37.3%) and definite fistulous tract in 15 (29.4%). Examination under anaesthesia (EUA) and cystoscopy were carried out in only 9 (17.6%) and 7 (13.7%) patients, respectively.

Sixteen (31.4%) patients required pre-operative treatment of VVF complications before surgery; 7 (13.7%) had nutritional rehabilitation and 6 (11.8%) were treated for urinary tract infections. Of the 53 repairs, 8 (15.7%) were primary, 26 (46.4%) were secondary, 15 (28.3%) were tertiary while 4 (7.5%) were quaternary repairs. The range of fistulae diameter was 0.3–2.8 cm with an average of 1.64 cm while 3 patients had associated UVF. Table 2 contains other details of fistulae characteristics and the procedures performed. Forty-one (77.4%) repairs were through a transperitoneal transvesical while 12 (22.6%) had an extraperitoneal transvesical approach. Six (11.8%) patients had ureteric re-implantation for fistulae close to ureteric orifices or associated UVF. Two (33.3%) of these six were bilateral. The average duration of urethral catheter insertion after repair was 17 days with a range of 14–30 days. All patients with suprapubic catheters (SPC) had their catheters removed at 2 weeks. All had prophylactic antibiotics and 21 (41.2%) had anticholinergics (oxybutynin or tolterodine); 9 (42.9%) of these 21 prophylactically and 12 (51.1%) for catheter-related discomforts and/or bladder spasms.

Eight of the 13 patients discovered at surgery to have small fistula size were the ones who still had a feeling of bladder fullness in addition with leakage of urine. A successful repair defined as maintenance of continence continuously after catheter removal was achieved in 47 (88.7%) repairs. This translated to the overall success rate of 92.1% in all 51 patients treated. The success rate was higher (94.3%) in 35 with failed initial transvaginal repairs compared with success rate of 60% in 10 with previous transabdominal or combined repairs. Breakdown of successful repairs based on the number of previous repairs is shown in Table 3. Only 4 (66.7%) of the six failed repairs were left with fistulae as two were successfully repaired subsequently as part of 13 successful tertiary repairs. Three (75%) of the remaining four patients with failed repairs were lost to follow-up, whereas 1 (25%) was not ready to undertake another repair at the time of this review. The route of previous repair and occurrence of the blocked catheter in the post-operative period were the only factors found to be significant regarding repair outcome. Table 4 shows a bivariate analysis of factors affecting the outcome of repair.

Table 2: Details of intra-operative characteristics and surgical repair of 53 fistulae

Characteristic/procedure	Frequency, *n* (%)
Number of tracts	
1	47 (88.7)
≥2	6 (11.3)
Size (widest diameter) (cm)	
Small (0-0.5)	13 (24.5)
Intermediate (0.6-2.5)	24 (45.3)
Large (>2.5)	16 (30.2)
Location in the bladder	
Trigonal	18 (34.0)
Supra-trigonal	35 (66.0)
Associated UVF	
Yes	3 (5.7)
No	50 (94.3)
Transabdominal approach	
Transperitoneal transvesical	44 (83.0)
Extraperitoneal transvesical	9 (17.0)
Omental flap interposition	
Yes	17 (32.1)
No	36 (67.9)
Ureteric re-implantation	
Yes	6 (11.3)
No	47 (88.7)
Urinary drainage technique	
Suprapubic cystostomy	34 (64.2)
Three-way catheter	19 (35.8)

UVF: Ureterovaginal fistulae

Discussion

VVF remains a devastating condition for women because of its numerous medical and social complications.[9] The treatment of VVF remains important in modern urology because it continues to constitute a major public health burden in the developing world.[3] Obstetric VVF affects young women of reproductive age with its attendant economic loss. Like other studies, the mean age of our patients is in the third decade of life due to the preponderance of obstetric fistulae in this review.[10,11] However, fistulae of post-operative origin commonly occur in older

Table 3: Outcome of surgical repair

	Primary surgical repair (*n*=8)	Secondary surgical repair (*n*=26)	Tertiary surgical repair (*n*=15)	Quaternary surgical repair (*n*=4)	Total (*n*=53)
Successful repair	8	23	13	3	47
Failed (unsuccessful) repair	0	3	2	1	6
Success rate (%)	100.0	88.5	86.6	75.0	88.7

Table 4: Bivariate analysis of factors versus outcome of repair

Variable	Successful repair, *n* (%)	Unsuccessful repair, *n* (%)	Total, *n* (%)	*P**
Number of previous repairs (*n*=53)				
0	8 (100)	0 (0)	8 (15.1)	0.553
1	23 (88.5)	3 (11.5)	26 (49.1)	
2	13 (86.7)	2 (13.3)	15 (28.3)	
3	3 (75.0)	1 (25.0)	4 (7.5)	
Route of previous repair (*n*=45)				
Transvaginal	33 (94.3)	2 (5.7)	35 (77.8)	0.017
Transabdominal	4 (57.1)	3 (42.9)	7 (15.5)	
Both transvaginal and transabdominal	2 (66.7)	1 (33.3)	3 (6.7)	
Aetiology (*n*=53)				
Obstetric	37 (86.0)	6 (14.0)	43 (81.1)	0.578
Post-operative	10 (100.0)	0 (0.0)	10 (8.9)	
Number of fistula tract (*n*=53)				0.532
1	42 (89.4)	5 (10.6)	47 (88.7)	
2	5 (83.3)	1 (16.7)	6 (11.3)	
Fistulae size (*n*=53)				
Small	13 (100)	0 (0.0)	13 (24.5)	0.346
Intermediate	21 (87.5)	3 (12.5)	24 (45.3)	
Large	13 (81.3)	3 (19.7)	16 (30.2)	
Site (*n*=53)				
Trigonal	15 (83.3)	3 (16.7)	18 (34.0)	0.396
Supra-trigonal	32 (91.4)	3 (8.6)	35 (66.0)	
Transabdominal approach (*n*=53)				
Transperitoneal (O'Conor)	16 (94.1)	1 (5.9)	17 (32.1)	0.844
Transperitoneal (modified O'Conor)	23 (85.2)	4 (14.8)	27 (50.9)	
Extra-peritoneal	8 (88.9)	1 (11.1)	9 (17.0)	
Blocked catheter (*n*=53)				
Yes	3 (50.0)	3 (50.0)	6 (11.3)	0.015
No	44 (93.6)	3 (6.4)	47 (88.7)	
Type of urinary drainage (*n*=53)				0.609
Suprapubic catheter	30 (88.2)	4 (11.8)	34 (64.2)	
Three-way catheter	17 (89.5)	2 (10.5)	19 (35.8)	

*Fisher's exact test

women.[4] This was also noted in this study. Eighteen (35.3%) of our patients were either separated or divorced or abandoned by their husbands stressing the social aspect of VVF. This may not be unconnected with associated ammoniacal urine smell resulting from the urinary incontinence with negative impacts on sexual and general wellbeing. This status has also been associated with poor outcome following repair.[10] Needless to say, the associated loss of the babies in these patients worsens the emotional and social impacts of this condition. More than half (65.9%) of the patients with obstetric fistulae in this study lost their babies either at birth (stillbirths) or in early neonatal life. Similar rate of foetal wastage was reported in a study in Eastern Nigeria.[11] The occurrence of VVF seems to have an inverse relationship with socio-economic and educational status. Slightly less than half (47.1%) of our patients were full-time housewives and majority (58.8%) had less than secondary education. While this was true for obstetric fistulae, it did not hold true for post-operative fistulae.

There are no accurate statistics on VVF in Nigeria, but the problem is acknowledged to be widespread, persistent and severe.[12] The relatively small number of patients in this study does not reflect the true situation. Most patients are primarily referred to the gynaecological section of our centre and are usually offered transvaginal repair. Majority of patients

referred to urologists in our centre are those who had failed repairs, high and/or complex fistulae.

It is interesting but sad to note that despite early onset of leakage following exposure to different aetiologic factors; it took an average of 31.3 and 57.1 months before presentation to the health-care facilities to seek help and before repair, respectively. The associated stigma may be responsible for the initial delay. In addition, many could not raise enough funds to seek proper medical attention early while the waiting period for operating time in our centre also contributed to the delay. This delay is not peculiar to VVF in developing world where majority live below the poverty line, and medical care is mostly out of pocket.[13]

The aetiology of VVF differs in different parts of the world. Prolonged obstructed labour constitutes the singular most common cause in the developing world. This is primarily due to shortage of medical care and poor obstetric services.[2,14] In this study, this was responsible for 80.4% of the VVFs. This is slightly less than reports in other studies from sub-Saharan African countries where about 90%–97% were caused by obstructed labour.[2,14] The relatively higher proportion of post-operative fistulae in this study compared with other reports from the sub-Saharan African country may also represent a changing trend in the aetiology of VVF in the developing the world. However, unlike in the developed world where post-operative fistulae account for about 75% of cases, they accounted for only 19.6% of cases in this study.[15]

The classical presentation of VVF is leakage of urine per vaginam after recent exposure to the aetiologic factor. All our patients noticed leakage of urine within 2 weeks. This conforms with the usual time needed for ischaemia and tissue separation that lead to fistulation eventually.[3] This is so because all the patients in this study had either obstetric or post-operative fistulae. Eight patients were able to maintain feeling of bladder fullness. This is the usual presentation of UVF. However, small-sized fistulae can also present this way.[3] Correspondingly, the 8 patients were among the 13 with small-sized fistulae at exploration. The diagnosis of VVF is clinical, but investigation of the patient and the fistula should be undertaken before repair. EUA and cystoscopy are useful to characterise fistula size and location in the vagina and bladder. These were not carried out routinely in our patients purely for financial reason.

The timing of surgical repair is one of the most contentious aspects of fistula management. While shortening the waiting period is of both social and psychological benefit, one must not compromise surgical success. There are literature reports stating that an early or postponed repair has no impact on the outcome of the fistula repair.[16] However, others have published discouraging reports about early repairs.[4,17] The classical time interval before repair of simple obstetric fistulae is 3–6 months to allow healing of any inflammation and oedema. However, radiation-induced fistulae require longer wait for at least 1 year.[3] Fortunately, waiting for this time interval was not a problem as many of our patients presented several months after the onset of symptoms and even had to wait the more for operating time before their fistulae could be repaired.

An important maxim with these injuries is that the first operation to repair a VVF has the best chance of success.[18] This is corroborated with our study where the success rate was 100% in patients who had primary repair with us while success rates decrease with subsequent repairs to 88.5%, 86.6% and 75% with secondary, tertiary and quaternary repairs, respectively. This reduction, however, was not statistically significant ($P = 0.609$). There are still conflicting reports on the impact of previous failed repair on the successful closure at subsequent repairs.[4,18]

Arguments continue as to whether the transabdominal or transvaginal route is most appropriate for fistula repair. The best approach is probably the one with which the surgeon feels most experienced and comfortable.[15,16] Lower perioperative morbidity justifies the recent trend towards transvaginal repair for simple fistulae and when clinically feasible. Despite positive reports in favour of transvaginal repair, the limitations of this approach are well documented.[3,7,8] Transabdominal route is recommended in cases with deep and/or narrow vagina preventing adequate access, fistulae close to ureteric orifices requiring ureteric re-implantation, contracted bladder requiring bladder augmentation and highly-located fistulae with poor transvaginal access.[9,19] Although majority of our patients had a supratrigonal and or complex fistulae, the choice of transabdominal route for all patients was purely based on our experience and training.

Principles of fistula repair include the excision of the scar tissue; anatomical separation of the bladder and vaginal walls; separate closure without tension in the best possible vascularised tissue; and adequate post-operative urine drainage. The O'Conor procedure was once recommended as the gold standard surgical method of supratrigonal VVF repair. It entails an intra-peritoneal approach, bivalving of the bladder to the fistula, anatomic separation and tensionless repair of vagina and bladder as well as omental interposition.[20] Nowadays, there are several modifications of this technique tailored to patients' need with equally good outcome. Only 17 (32.1%) repairs were the typical O'Conor procedure with omental interposition. Twenty-seven (50.9%) repairs were modified procedure without tissue interposition while 9 (17%) repairs were extra-peritoneal transvesical approach. The success rates for the three techniques were not different depicting that strict adherence to basic principles of fistulae repair was more important than the actual method employed. The successful repair rate of 88.7% translates to the overall success rate of 92.1% in the 51 patients. The success rate is relatively higher (94.3%) in patients with failed initial transvaginal repairs compared with success rate of 60% in those with previous transabdominal or combined repairs. This suggests a strong role for transabdominal repair for recurrent fistulae following initial failed transvaginal repair. Alternatively, it may

mean that most of the patients who had initial unsuccessful transvaginal repairs were candidates who should have been offered transabdominal repair ab initio. In addition, we noticed 100% success rate in post-operative fistulae. This may be due to higher location of the fistulae making them more accessible transabdominally. In addition, compared with the obstetric fistulae, post-operative fistulae are less technically demanding. They are usually small, not complex and have better viable surrounding tissue. This is also in agreement with authors who recommended transabdominal repair for high post-operative and complex fistulae.[21,22] Over the last few decades, laparoscopy and robotic reconstruction have been incorporated into the armamentarium of fistula repair. Excellent results have been reported with the main advantages being lower morbidity and a more rapid recovery.[23,24]

Pressure at the repair site is one of the factors that may cause repair breakdown. To avoid this, we adapted a technique similar to Malament suturing in prostatectomy.[25] This involved the use of a double-armed suture of 2–0 nylon placed through the urethral catheter tip and carried in both directions to exit the bladder wall. Following bladder closure, the needles were cut-off and sutures were then threaded on large straight-cutting needles, passed out above the pubis symphysis, through the anterior abdominal wall and skin and tied over a button or some other anchors under slight tension to elevate the catheter balloon from the repair site. We strongly believe that this contributed to the high success rate recorded in our patients. However, a randomised control study may be required to demonstrate the usefulness of this adaptation.

Bivariate analysis did not reveal any significant effect of fistula and operative factors such as size and number of tracts, number of previous repairs and fistula site on the outcome of transabdominal repair. This result is similar to some others.[22,26] In contrast, some studies reported these factors as a negative predictive factor for successful repair.[18,27] On the other hand, the blocked catheter was found to be a significant factor affecting treatment outcome. Without any doubt, an adequate post-operative care is critical and sine qua non for a successful repair. Important measures include adequate hydration that ensures constant fluid flow through the bladder and help to prevent any catheter blockage due to blood clots, which causes bladder distension and disruption of the repair. It is for the same reason that some authors routinely insert SPC at surgery.[28] In our practice, we initially inserted SPC in all patients. This practice has however waned with the availability of large-sized, large-eyed, three-way haematuria catheter with less likelihood of blockage. Healing of repair may also be impaired by infection and bladder spasm. Some surgeons advocate the routine use of prolonged post-operative antibiotic and anticholinergic drugs.[3,29] Following successful repair, patients and their partners should receive health education on family planning, contraception and management of subsequent pregnancies. We usually advise patients to abstain from sexual intercourse for about 3–6 months after repair. An elective C-section is the preferred method of subsequent deliveries as vaginal delivery and emergency C-section are associated with increased risk of stillbirth, fistula recurrence or even maternal death.[30]

Conclusion

The results of this study show that transabdominal repair of fistula has an excellent result in both primary and re-operative VVF, especially following failed transvaginal repairs. Patients with previous unsuccessful transvaginal repair appear to do well with a transabdominal repair. Therefore, referral to centres or units with appropriate expertise may be necessary in some patients as demonstrated in this study. Our study, therefore, makes a case for transabdominal repair in patients with recurrent failed transvaginal repairs or when it is the surgeons preference.

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Conflicts of interest

There are no conflicts of interest.

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