



CASE REPORT

REVISED Case Report: Use of reinforced buccal mucosa graft over gracilis muscle flap in management of post high intensity focused ultrasound (HIFU) rectourethral fistula [version 2; referees: 2 approved]

Shrikant Jai ¹, Arvind Ganpule ¹, Abhishek Singh¹, Mohankumar Vijaykumar¹, Vinod Bopaiah², Ravindra Sabnis¹, Mahesh Desai¹

¹Dept. of Urology, Muljibhaipatel Urological Hospital, Gujarat, India

²Staten Island University Hospital, Staten Island, USA

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Abstract

High intensity focused ultrasound (HIFU) has come forward as alternative treatment for carcinoma of the prostate. Though minimally invasive, HIFU has potential side effects. Urethrorectal fistula is one such rare side effect. Management of these fistulas has been described by Vanni *et al.* This case report describes points of technique that will help successful management of resilient rectourethral fistula. Urinary and faecal diversion in the form of suprapubic catheter and colostomy is vital. Adequate time between stoma formation, fistula closure and then finally stoma closure is needed. Lithotomy position and perineal approach gives best exposure to the fistula. The rectum should be dissected 2cm above the fistula; this aids in tension free closure of the rectal defect. Similarly buccal mucosal graft was used on the urethra to achieve tension free closure. A good vascular pedicle gracilis muscle flap is used to interpose between the two repairs. This not only provides a physical barrier but also provides a vascular bed for BMG uptake. Perfect haemostasis is essential, as any collection may become a site of infection thus compromising results. We strongly recommend rectourethral fistula be directly repaired with gracilis muscle flap with reinforced buccal mucosa graft without attempting any less invasive repairs because the “first chance is the best chance”.

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- 1 **Sanjay B. Kulkarni**, Kulkarni
Reconstructive Urology Center India,
Pankaj Joshi, Centre for Reconstructive
Urology India
- 2 **Alex J. Vanni**, Tufts University School of
Medicine USA

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Corresponding author: Arvind Ganpule (doctorarvind1@gmail.com)

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REVISED Amendments from Version 1

In response to reviewer comments, we have amended the article to acknowledge that Vanni *et al.* (2010) were the first to demonstrate closure of HIFU RUF with this technique. We have also altered the discussion to include more up to date information on RUF as described by Vanni *et al.* (2010).

See referee reports

Introduction

High intensity focused ultrasound (HIFU) is a treatment option in the management of prostate cancer¹. When combined with transurethral resection of prostate (TURP), risk of post procedure retention of urine and other side effects are significantly reduced. Urethrorectal fistula is a serious complication of HIFU. Literature reports a rate of urethrorectal fistula following HIFU² of approximately 0.7%. This case report describes management of recurrent urethrorectal fistula after HIFU with buccal mucosa graft (BMG) over a bed of gracilis flap.

Case report

A 52-year-old man was evaluated for lower urinary tract symptoms (LUTS) and found to have raised PSA levels of 18.70 ng/ml. Transrectal ultrasound (TRUS) guided biopsy showed adenocarcinoma of the prostate with a Gleason's score of 3+4 with evidence of extracapsular spread on the left side. Bone scan showed osteoblastic activity at the distal end of the right femur. Ultrasound (USG) showed 30 g prostate. He underwent an initial TURP to debulk the gland. Following the intervention in the same sitting he underwent HIFU. Histopathology showed 50% of the cores were positive for adenocarcinoma with a Gleason's score of 4+4. The Foley catheter (PUC) was removed on the 5th post-operative day (POD). On the 15th POD, the patient had urine leak via the rectum. Diagnostic cystoscopy showed a single fistulous opening above the level of the external sphincter. As conservative management failed in form of suprapubic catheter (SPC), he underwent robotic assisted laparoscopic excision of the fistula. The bladder and rectum were closed separately with interposition of an a cellular matrix sheet in between.

On the 6th POD following robotic repair, the patient developed fecaluria which was managed with loop sigmoid colostomy and SPC. Repeat cystoscopy after 3 months showed persistent fistula (Figure 1). He was planned for repeat surgery via perineal approach in view of his previous failed abdominal surgery and faecal contamination of abdomen.

The patient was placed in lithotomy position with the perineum nearly horizontal. An inverted smiling incision was made in the perineum above the anus (Figure 2). Dissection showed dense adhesions between the rectum and surrounding tissue. Digital rectal examination done intraoperatively ensured rectal wall integrity. The fistula was at the 1 o' clock position between the prostatic urethra and rectum (Figure 3). All scar tissue and fistula was excised to create healthy margins. The rectal defect was repaired in transverse fashion in a single layer with monocryl

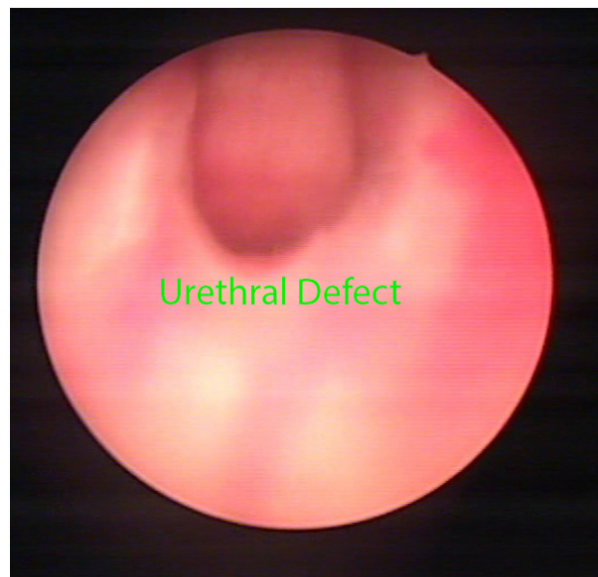


Figure 1. Cystoscopy showing urethral defect.

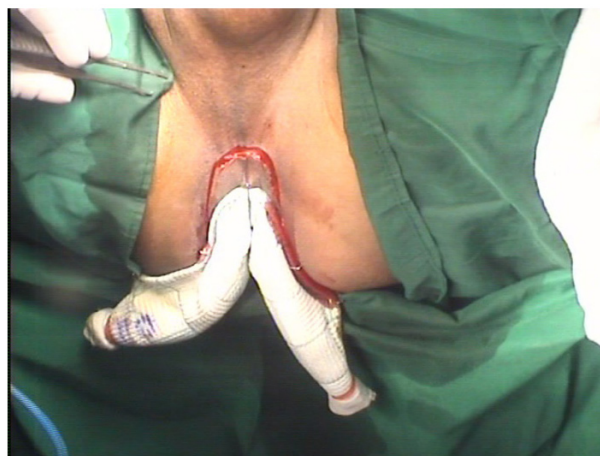


Figure 2. Perineal incision above anus.

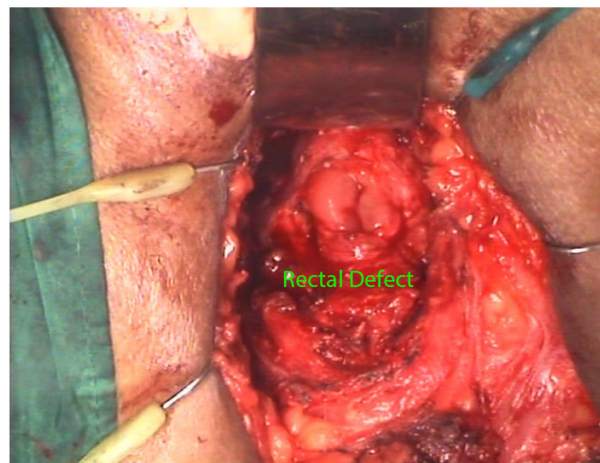


Figure 3. Rectal wall defect at the level of fistula.

2-0 sutures (Figure 4). BMG was harvested and positioned to bridge the urethral defect; it was anchored with interrupted 3-0 monofilament sutures (Figure 5). A separate incision was made on the left thigh from the adductor tubercle to 2cm above the medial condyle. The gracilis muscle flap was harvested, rotated towards the perineum (Figure 6) and interposed between the rectal and urethral repair (Figure 7). Prior to closure of wound, adequate haemostasis was ensured.

On the 14th POD the PUC was removed and SPC blocked. The patient was voiding well with a satisfactory uroflow without any leak of urine from the rectum. Colostomy closure was done after 3 months. On follow-up visits at 3 and 6 months, the patient was asymptomatic.

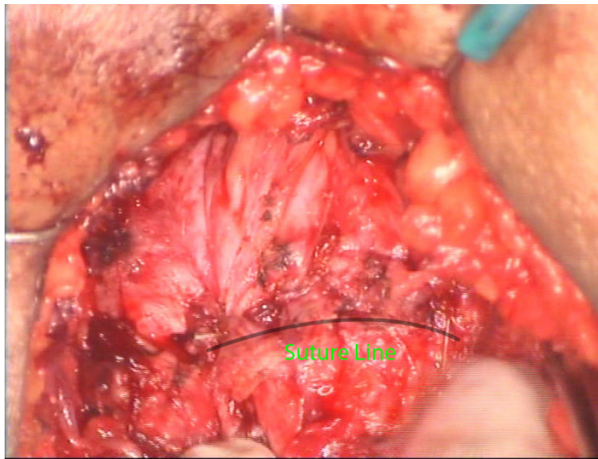


Figure 4. Suture line of rectal wall defect repair.

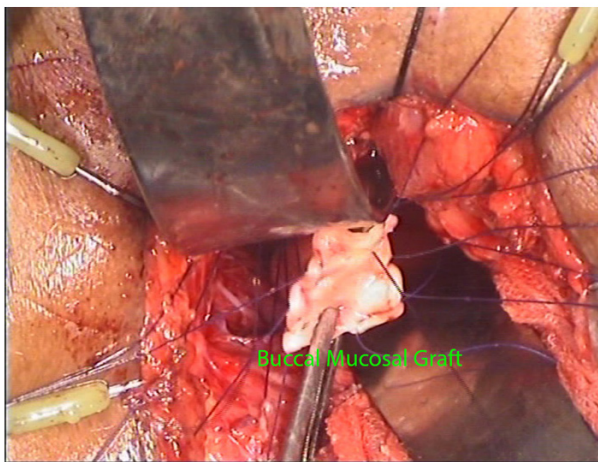


Figure 5. Buccal mucosal graft (BMG) with anchoring sutures.

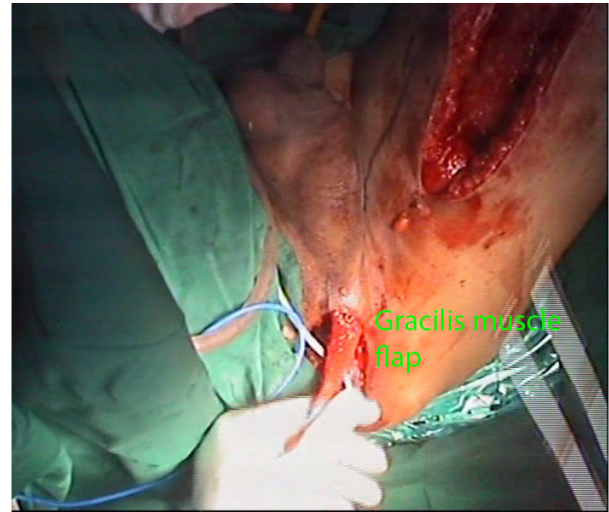


Figure 6. Gracilis muscle flap rotated to perineum.

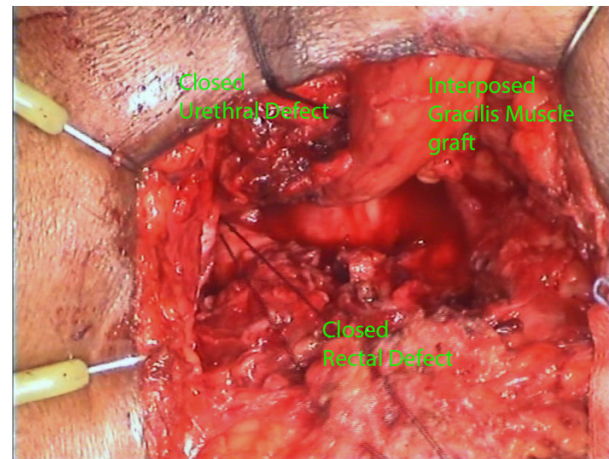


Figure 7. Gracilis muscle flap interposed and fixed between rectal and urethral repair.

Discussion

The gracilis muscle flap was first described by Ryan *et al*³ for closure of rectourethral fistula. The gracilis muscle flap fulfills all the criteria of an ideal flap for interposition in such situations due to its rich vascular supply and ease of rotation.

Rabau *et al*⁴ described a series of 10 patients who underwent gracilis flap repair for rectourethral or rectovaginal fistula. Of these, 3 patients had fistula post radical prostatectomy and a prior failed attempt of fistula repair. On mean follow-up at 26 months

they reported a 100% success rate. The results of our report closely resemble those of Michab *et al.*

In a series of 35 patients by Ulrich *et al*⁵, 4 patients had fistula post radical prostatectomy and all were treated successfully with a mean follow up time of 28 months. The patients included those with iatrogenic rectal injury during retropubic prostatectomy. Our case represents an injury due to high intensity focal ultrasound given for prostate cancer.

In a series of 11 cases by Zmora *et al*⁶, 9 patients healed without complication and 2 others required further surgical management. Thus a success rate of 81% was achieved. This series included two patients with post radical prostatectomy fistula in two instances. The authors advocated this approach in failed previous repairs as in our case.

The technique of harvesting BMG was first described by Allen F. Morey *et al*⁷ in 1996. Andrich DE⁸ reported better results for dorsal as opposed to ventral onlay due to more vascular and better bed of corporal bodies for graft uptake. Further it was found that strictures in sittings of ischemia are better repaired with flaps due to poor surrounding blood supply. In our case the urethral defect was 2.5cm and in the prostatic urethra with local ischemia, thus a BMG without the gracilis muscle flap bed would result in a poorer outcome.

More recently Vanni *et al*⁹ published case series of 74 patients with rectourethral fistula which included 2 patients with post-HIFU rectourethral fistula. There patients under went fistula repair with interposition muscle flaps with or without BMG with overall success rate of 84%. This article confirms the feasibility of combined BMG and gracilis muscle flap repair and thus provides a proof of concept for our case report.

Conclusion

Rectourethral fistula secondary to HIFU should be categorised as a complicated fistula owing to the hostile environment caused by the local heat generated by primary treatment. This report suggests

rectourethral fistula post HIFU should be repaired with gracilis muscle flap with reinforced buccal mucosa graft as the “first chance in the best chance” in such situations.

Key messages from our case report

1. Good exposure and adequate dissection is vital; this was achieved by the perineal approach.

2. Tension free repair of the rectum was achieved by dissection of rectum 2 cm cranial to the fistula and on the urethral side; buccal mucosa graft was used for tension free repair.

3. As both rectum and urethra are high pressure zones, there is a high probability of failure if both the repairs are not separated by live tissue¹⁰. Ideal tissue for this interposition is a tissue with its own blood supply, in this case a pedicle gracilis muscle flap. The advantage of this flap was it acts as a physical barrier as well as a vascular bed for BMG.

4. Adequate haemostasis and good closure is equally important, as any collection is likely to get infected leading to recurrent fistula. Closure over suction drain helps in reducing the chances of collection, and also to keep buccal mucosal graft adherent to surrounding vascular tissue, thus helping in graft uptake.

Consent

Written informed consent for publication of the patient’s clinical details and clinical images was obtained from the patient.

Author contributions

AG,SJ,AS and MV wrote, revised the manuscript. SJ,AG, AS,MV, VB,RS, and MD are responsible for the concept and content.

Competing interests

No competing interests were disclosed.

Grant information

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Version 2

Referee Report 13 February 2017

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Alex J. Vanni

Department of Urology, Institute of Urology, Lahey Hospital & Medical Center, Tufts University School of Medicine, Burlington, MA, USA

The authors have adequately addressed all concerns.

I have read this submission. I believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard.

Competing Interests: No competing interests were disclosed.

Version 1

Referee Report 09 January 2017

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Alex J. Vanni

Department of Urology, Institute of Urology, Lahey Hospital & Medical Center, Tufts University School of Medicine, Burlington, MA, USA

This article demonstrates that a HIFU induced RUF can be successfully closed with a buccal graft and gracilis muscle flap. I agree with the authors that this technique is the preferred way to treat these RUF.

The article contends this is the first case demonstrating this in the literature. In fact, we published this first in 2010, in which 2 patients of our cohort had HIFU RUF that were successfully repaired with this technique. This report should be changed to appropriately acknowledge that we (Vanni *et al*) were the first to demonstrate closure of HIFU RUF with this technique with the appropriate reference cited.

Here is this reference:

Vanni AJ¹, Buckley JC, Zinman LN. Management of surgical and radiation induced rectourethral fistulas with an interposition muscle flap and selective buccal mucosal onlay graft. *J Urol*. 2010 Dec;184(6):2400-4.

- Another point: In the discussion the authors state:

"Zinman⁹ described 68 patients with rectourethral fistula who underwent gracilis muscle flap repair out of which 27 were performed in combination with BMG".

This reference is antiquated and we have published 2 more extensive papers on the topic more recently that should be cited instead of the one used by the authors. Vanni *et al* is a better reference for this sentence and the one I previously mentioned above. In this paper, 74 patients had RUF repair with a gracilis muscle flap. 39 of these patients had a RUF from an ablative source (radiation and 2 HIFU). Of these 39 patients, 34 had a buccal mucosa graft (including the 2 HIFU cases) used to close the urethral defect. 37 of these patients had at least 1 gracilis muscle flap, while the other 2 patients had an inferior gluteus maximus flap and a Singapore fasciocutaneous flap.

I have read this submission. I believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard, however I have significant reservations, as outlined above.

Competing Interests: No competing interests were disclosed.

Referee Report 29 December 2016

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Sanjay B. Kulkarni¹, Pankaj Joshi²

¹ Kulkarni Reconstructive Urology Center, Pune, Maharashtra, India

² Department of Urology, Centre for Reconstructive Urology, Pune, Maharashtra, India

The authors have highlighted an important complex subject of post HIFU Recto Urethral fistula.

As stated this should be classified as complex fistula.

Management requires multiple options and an experienced team of Reconstructive Urologists.

Using a vascularised flap is important interposition tissue.

The authors have simultaneously augmented the urethra with buccal graft.

We agree with all the key messages as highlighted by authors.

We suggest this article be indexed and be made available as early as possible

We have read this submission. We believe that we have an appropriate level of expertise to confirm that it is of an acceptable scientific standard.

Competing Interests: No competing interests were disclosed.
