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Role of bulking agents in bladder exstrophy-epispadias complexes

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ABSTRACT

Background: Role of pelvic osteotomy in surgical management of bladder exstrophy is controversial But pelvic rim closure importantly. Bulking agents have been used for perineal and pelvic dysfunction in adults. In this study, bladder extrophy repair was performed without pubic closure And bulking agent injections were used as the strut of anterior pelvis for prevention of Organ prolapse and other functions in this series. **Patients and Methods:** During the period 2008-2012, twenty-five exstrophy-epispadias complex patients with a mean age of 14 months underwent surgical reconstruction. Rectus abdominis Muscle was detached from the superior pubis and sutured to each other in the midline and Re-anchored at the pubis and 8-9 month later urethra was constructed and placed between prineal muscles. Bladder neck repair and intersyphyseal reconstruction was done With bulking agents one year after primary bladder closure when in our series bladder Prolapse mainly occurred. One to 4 mL of bulking agents polyacrylate (vantris/promedon) was injected at the level of the intersymphyseal area and opening on either sides of the urethra. **Results:** Mean urinary continence score, before, 3 and 6months after injection Were (2.65 ± 074),(1.95 ± 082),(1.75 ± 0.78), respectively. ($p < 0.001$). The correlation factor Between before injection, 3 and 6 months were %82, %74 spectively. Mean capacity of bladder before, 3, 6 months after injection were (31 ± 14.01), (41 ± 12.81), (56 ± 11.98) mml, respectively. The correlation factor before and after injection were 59%. Comparing the CS and CB between male and female before and after Injection were significant. ($p < 0.001$) but correlation factor in male 99% and Female 74%. Three out of five girls had improved bladder prolapse. There was no Complication, infection or migration of bulking agents. Patients had increased in soft tissue according to MRI. **Conclusion:** Using bulking agents is a good alternative to sling pelvic floor not only cosmetically but also for ease of patients and operation.

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INTRODUCTION

Bladder exstrophy remains one of the most challenging conditions managed by pediatric urologists. Although rare, this disorder imposes significant physical, functional, social, sexual, and psychological burdens on patients and families.[1] Surgeons usually start treating the exstrophy patients with early bladder closure and osteotomy, however, the role of pelvic osteotomy to achieve closure of the abdominal wall and in the achievement of continence is controversial.[2-4] Pelvic brim needs to be completed so that the closed bladder can be retained in a recessed pelvic position and also to provide an angulation between the bladder and the urethra but not closing the pelvic brim predispose those patients to pelvic organs prolapse.[1]

Now-a-days many bulking materials that are biocompatible, nonimmunologic and hypoallergenic are approved for use or currently being studied for perineal and pelvic dysfunction in adults.[5]

In this study, bladder extrophy repair was performed without pubic closure to assess the change in pelvic functional anatomy in response to bulking agent injection by measuring involved parameters after urethral reconstruction.[4]

PATIENTS AND MATERIALS

During the period 2008-2012, twenty-five exstrophy-epispadias complex patients with an age range of 1 to 2.5 mean age 1.4 months underwent surgical reconstruction. The patients had undergone the initial bladder closure and subsequent operation respectively, and then were enrolled in this pilot study.[2] The study

performed after description of the study to the parents and taking written informed consent. The ethical committee of the University of Medical Sciences has approved the study.

The technique of abdominal wall closure entails detachment of the rectus abdominis muscle from the superior pubic ramus on either sides and suturing to each other in the midline with 2-0 polyglactin sutures. The muscles were then pulled caudally and re-anchored at the pubic symphysis and this completed the pelvic brim outlet obstruction.[2]

Urethral reconstruction was done in 8-9 month after bladder closure and placed between perineal muscles in boys like hpospadias and intersyphyseal reconstruction was done at least 1 year after primary closure of the bladder exstrophy-epispadias complex.

Postoperatively, the patients were followed by renal biochemistry, upper tracts monitoring by radionuclide renography and ultrasound scan. Bladder was evaluated by urodynamic study, micturating cystourethrography and ultrasonography for size, shape, residual urine and vesico-ureteral reflux.[1-3]

The patients placed in lithotomy or supine position. Sites of injection were selected at the level of the intersymphyseal area and opening on either sides of the urethra. Using a 30 gauge needle, 1 to 4 mL of bulking agents polyacrylate microsphere (Vantris, Promedon/ Argentina) microsphere were injected for making a sling for pelvis [Figure 1].

Antibiotics were given immediately before or 1 or 2 days after injection. The patient observed for a minimum of 2 hours for decreasing the amount of swelling at the site of injection enough to allow voiding.

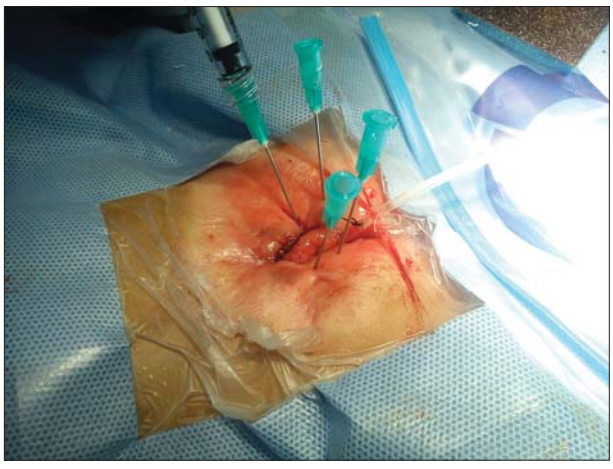


Figure 1: Injection of vantris in intersymphyseal and paraurethral site

The assessment of continence was graded into four groups. Group I: Dry during day >2 hours, Group II: Dry during day for >1.5 hours, Group III: Dry during day for <1 hour, Group IV: Continuously wet.

The data were charted by the parents.[1] Patients with group II continence were treated with oral oxybutinin and those with group III continence also received oral oxybutinin. The patients also followed up with magnetic resonance imaging (MRI) for changes in tissue and volume changes and score for 6-12 months. The softness of pubic area that graded with our clinical score (1-3 mild to severe).

Expected capacity (EC) measured as 16 × age + 70 ml and the bladder volume was checked by length of catheter and sonography.[1]

Statistical analysis

Data was analyzed with SPSS version 15 software. Wilcoxon Signed Ranks test was used for comparing continence score. Expected capacity changes byFriedman non-parametric test.

RESULTS

Patients comprised of 16 boys and 9 girls with classic exstrophy-epispadias complexes. Eighteen out of 25 had softness of pubic area, 9 with grade 3, 5 grade 2 and 4 grade 1. Five of girls patients had prolapse of bladder mucosa during 9-10 months when erect position acquired and bladder volume increased.

Immediately after injection, all the patients had pain and urethral burning with urination, which lasted for only part of a day and could be controlled with phenazopyridine. If voiding did not occur or was associated with high residual urine, foley catheter inserted. Mean urinary continence score, before, 3 and 6months after injection were (2.65 ± 074), (1.95 ± 082), (1.75 ± 0.78), respectively. ($p<0.001$) the correlation factor of before injection, 3 and 6 months were 82%, 74% respectively.

Mean capacity of bladder (CB) before, 3,6months after injection were (31 ± 14.01), (41 ± 12.81), (56 ± 11.98) mml, respectively. The correlation factor of before and after injection were 59%.

Comparing the CS and CB between male and female before and after injection were significant. ($p < 0.001$) but correlation factor in male 99% and female 74% [Table 1].

Three out of five (60%) had improved bladder prolapse. We had no complications ormigration of bulking agents. Patients had increased in soft tissue density at sites of injections depicted in MRI [Figures 2 and 3].

DISCUSSION

In the current study, we did not perform pelvic osteotomy in patients with exstrophy-epispadias complex. Role of pelvic osteotomy in the overall management of patients with urinary bladder exstrophy is controversial.[2] Pelvic osteotomy is not essential for repair of the anterior abdominal wall in bladder exstrophy patients. Bhatnagar,[1] reported equally good cosmetic results without pelvic osteotomy in these patients.

Osteotomy has gained importance in the prevention of uterine prolapse and the overall functional outcome; despite this, the reconstructive methods used to close

Table 1: Demographic and variable changes of CS and EVC in patients underwent exstrophy repair without pubic closure

No.	Age	Sex	Score Continence			Expected Volume Capacity			MRI	Complication
			Before	After 3 month	After 6 month	Before	After 3 month	After 6 month		
1	1.5	F	4	3	3	20	30	70	↑	No
2	2	F	3	3	3	35	40	60	↑	No
3	2.5	F	3	2	2	40	50	65	↑	No
4	1	F	3	2	1	50	55	60	↑	No
5	1.5	F	2	1	1	60	70	75	↑	No
6	2	F	2	2	2	50	60	70	↑	No
7	2.5	F	2	2	2	60	65	70	↑	No
8	2	F	2	1	1	30	40	50	↑	No
9	2	F	2	2	1	20	30	70	↑	No
10	1.5	M	2	1	1	25	30	60	↑	No
11	1	M	3	2	2	30	35	50	↑	No
12	2	M	2	2	2	15	35	50	↑	No
13	2	M	3	2	1	15	25	30	↑	No
14	1.5	M	3	2	2	25	45	50	↑	No
15	2	M	2	1	1	30	40	50	↑	No
16	1.5	M	4	3	3	30	40	40	↑	No
17	2	M	4	4	3	25	40	50	↑	No
18	1.5	M	2	1	1	20	30	45	↑	No
19	1.5	M	3	2	2	20	30	50	↑	No
20	2	M	2	1	1	20	30	60	↑	No



Figure 2: MRI of pelvic and pubic region before injection



Figure 3: MRI of pelvic and pubic region 6 month after injection

the pelvis in early childhood, the symphysis will always reopens and influences the reconstructive surgery of pelvic soft tissue.[2]

Bhatnagar[1] experience has shown that even with different types of pelvic osteotomy, the closure of pubic symphysis does not remain intact over a period of time. Hence, what is really important is the completion of the pelvic brim with or without osteotomy.

Many report that pelvic osteotomy call for participation of orthopedics and this may cause logistical problems at times. A high morbidity is associated with the pelvic osteotomy and the restrictive dressings should be applied subsequently.[3,4]

In our experience the morbidity is much less, dressings are not restrictive and the patient is encouraged to adopt comfortable postures in bed and later move about even with the catheters. Also, good urinary continence can be achieved even without pelvic osteotomy. This study shows that all parameters including CS, BV, and prolapse significantly improve which implicate the increases in pelvic out let by bulking agents.

For prevention of uterine prolapse and other pelvic organ prolapse bulking agent showed accepted results in gynecology[5] however no trial has been done in patients with exstrophy-epispadias complex.

Increased soft tissue density at the injected sites was also demonstrated in follow up MRI evaluation and in physical examination. Patients had improved in struts of pubic region that has completed the pelvic ring.

The major points favoring use of this procedure are long-term durability, effectiveness in cases with impaired urethral sphincter function or restricted mobility of the bladder neck with minimal risk of complications.[6-8]

CONCLUSION

Using bulking agents is a good alternative to sling the pelvic floor not only cosmetically but also for ease of patients and operation, however, this is a pilot study and further larger trials needed to prove the exact efficacy and role of these materials in bladder exstrophy complex surgery.

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