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Research Article

TO DETERMINE THE HIGH RISK OF EARLY COMPLICATION RATE AMONG NORMAL RENAL FUNCTION PATIENTS VERSUS IMPAIRED RENAL FUNCTION PATIENTS IN POSTOPERATIVE AUGMENTATION CYSTOPLASTY

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Abstract:

OBJECTIVE: "To determine the high risk of early complication rate among normal renal function patients versus impaired renal function patients in postoperative augmentation cystoplasty"

MATERIAL AND METHODS: We retrospectively analyzed a total of 40 patients; 20 patients are in Group A (normal renal functioning) 20 patients are in Group B (impaired renal functioning) in which 26 male and 14 females who underwent augmentation cystoplasty and were registered during last 5 years starting from January 2015 till December 2019.

RESULTS: The mean ages of these patients were 31.73 ± 10.73 in the range of 18-56 years and there were 65% males and 35% females in these groups. In early postoperative duration the differences of early complications in both groups up to three months of follow-up were observed. Out of 20 patients in each groups 14 (70%) were presented with fever in group A and 17(85%) were in group B (P=0.451), whereas Hematuria occurs in 2 (10%) patients of group A and 3 (15%) patients of group B and (P=0.999), the symptoms of Post operative ileus were seen in 13 (65%) patients in group A and 18 (90%) in group B and (P=0.127), while the occurrence of Surgical site infection was observed in 9 (45%) patient in group A and 13 (65%) patients in group B (P=0.202), and Urinary leakage was seen in 3 (15%) patients in group A and in 5 (25%) were in group B (25%) and (P=0.695), however Deep venous thrombus/pulmonary edema in 1 (5%) patients in group A and 2 (10%) in group B (P=1.000), whereas Fecal leakage and Ruptured augmented bladder has not occur in both groups and these groups are constant.

CONCLUSION: In our study the higher risk of early complications rate was seen in impaired renal function patients as compared to normal renal function patients within 3 months follow-up in SIUT. We concluded that patients with increased baseline creatinine levels after surgery are prone to develop early complications in postoperative duration.

KEYWORDS: Augmentation cystoplasty, ileocystoplasty, bladder augmentation, small capacity bladder, enter cystoplasty.

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INTRODUCTION:

Augmentation cystoplasty is a reconstructive procedure designed to increase bladder capacity by incorporating a segment of intestine.¹The purpose of the surgery is to expand the volume of the bladder and decrease its pressure and spasticity.²The primary purpose of any reconstructive procedure is to provide the better quality of life with the lowest risks of complications.³

Augmentation ileocystoplasty was first described in the canine model by Tizzoni and Foggi in 1888 and subsequently in humans by von Mikulicz in 1889. The technique was popularised by Couvelaire in the 1950s, as a treatment for small contracted tuberculous bladders. The introduction of clean intermittent self catheterisation (CISC) by Lapedes et al, resulted in more widely use of AC.^{4,5}Since the first augmentation cystoplasty performed by Mickulicz in 1889, the operation has undergone myriad modifications and improvements, all aimed at providing a low pressure, high-volume, functional reservoir. The widespread experience has led to improved results and has minimized problems; however, no bowel segment is a perfect physiological substitute for the native bladder, and complications may still occur after augmentation cystoplasty.⁶

Augmentation cystoplasty (AC) with ileum remains the current gold standard surgical treatment for many patients with end-stage bladder disease.⁷Augmentation enterocystoplasty is a procedure with long-term durability and high rates of patient satisfaction but not without risk of complications and potential increased risk of malignancy.^{8,9}

Enterocystoplasty is a generic terminology indicating that a bowel segment is used to increase the bladder capacity. Based on what part of the bowel is used a different terminology applies. The most frequently used bowel segment for AC is a detubularised patch of ileum.¹⁰ As a result complication inherent to this

procedure are not limited to those that are common to any abdominal surgery but also those that result from both the disruption of the gastrointestinal tract, and the interposition of different types of bowels into the urinary tract.¹¹

Bladder augmentation cystoplasty (AC) is used in the adult population for neurogenic bladder dysfunction, as well as for inflammatory conditions such as tuberculosis cystitis that result in a severely contracted bladder, interstitial cystitis, and reconstruction of iatrogenic bladder injury.¹² AC is indicated for neurogenic and non-neurogenic bladder dysfunction where other interventions (conservative, behavioral, life-style modification, drug and intravesical therapies) have failed. Specially, bladder augmentation is described as beneficial in patients with underlying neurological disorders such as spinal cord injury, multiple sclerosis and myelodysplasia.¹³Congenital conditions of the LUT including bladder and cloacal exstrophy, posterior urethral valves and epispadias can result in small capacity, poorly compliant bladders, associated with risk to the upper urinary tract. Modern staged repair of exstrophy-epispadias complex aims to create a good bladder capacity and adequate outlet resistance, and results in continence in 60 – 80% of patients.^{14,15} Augmentation cystoplasty (AC) has traditionally been used in the management of small capacity, poorly compliant, or refractory overactive bladder. Severe bladder dysfunction has deleterious effects on the upper renal tract in terms of renal function deterioration in both native and transplanted kidneys.High storage pressure because of bladder dysfunction can cause vesicoureteric reflux and subsequently impair renal function.¹⁶ The technique aims to provide urinary storage, protect the upper urinary tract and preserve renal function, provide continence, resistance to infection and offer a convenient method of voluntary and complete emptying.¹⁷

Augmentation cystoplasty is used in an attempt to preserve and improve renal function. In spite of this, deterioration in renal function has been observed in 0 to 15% of patients after augmentation cystoplasty. AC may be used in patients with renal failure before transplantation; 15% of patients with end-stage renal failure have lower urinary tract dysfunction.^{18,19}

The goal of this study is to evaluate the high risk of early complication rate in normal renal functioning patient versus impaired renal functioning patients.

MATERIAL AND METHODS:

eGFR Calculating MDRD Formula;

$$\text{eGFR (ml/min/1.73m}^2\text{)} = 186 \times (\text{serum Cr})^{-1.159} \times (\text{age})^{-0.203} \times (0.742 \text{ if female})$$

Pre-Procedure Patient Categorization According To National Kidney Foundation

Criteria For Chronic Kidney Disease (CKD On The

Basis Of eGFR Value), Its

Include CKD Stages;

Stage 1 CKD = eGFR >90 ml/min/1.73m²

Stage 2 CKD = eGFR 60-89ml/min/1.73m²

Stage 3 CKD = eGFR 30-59ml/min/1.73m²

Stage 4 CKD = eGFR 15-29ml/min/1.73m²

Stage 5 CKD = eGFR <15ml/min/1.73m²

Study Design:

Retrospective comparative study

Place Of Study:

Sindh Institute of Urology and Transplantation

Duration Of Study:

3 months study time after approval of synopsis and the study will be done retrospectively.

Sample Size:

The total number of patients will be 40. Group A will have normal functioning patients and group B will have impaired renal functioning patient; both groups will have 20 patients respectively those were registered during last 5 years starting from January 2015 till December 2019.

Sampling Techniques:

Non-probability consecutive sampling technique

Sample Selection:

Inclusion Criteria:

- All adult patients ≥ 18yrs.
- All patients with small capacity, poor compliant with high or normal intravesical pressure proven by urodynamics studies.

- Patient who failed maximum conservative therapy with (Clean intermittent self-catheterization, antimuscarinic medication).

Exclusion Criteria:

- Patient under aged 18 yrs.
- Patient who underwent ureterocystoplasty or augmentation done in another hospital.
- Patients in which only creation of mitrofanoff, monti and bladder neck reconstruction without augmentation ileocystoplasty.

Data Collection Procedure:

After getting ethical approval, patients who were recorded in record book of Sindh Institute of Urology and Transplantation and were operated by open augmentation cystoplasty, and fulfilling the inclusion criteria will be included in this study until the required sample size is completed. Informed consent will be taken from all patients before including them in this study. All patients will be informed regarding study protocols and outcomes before including them in study.

Data Analysis Procedure:

All the data will be entered and analyzed in SPSS version 20. Continuous variables like age will be expressed as mean ± S.D. Categorical variables such as gender, procedure, early complications (fever, hematuria, post-operative ileus, surgical site infection, urinary leakage, fecal leakage, rupture augmented bladder, deep venous thrombosis) will be presented as frequency and percentage at follow up visits 1, 2 and 3, and their proportion differences will be determined using chi-square 't' between groups. P-value < 0.05 will be considered as significant.

Results and Observations

There was a total of 40 patients; 20 patients in normal renal function patients and 20 patients in impaired renal function patients. The rate of early complications in postoperative augmentation cystoplasty is fever, hematuria, post operative ileus, surgical site infection, urinary leakage, fecal leakage, rupture augmented bladder, deep venous thrombus/pulmonary edema at 3 months follow-up are compared between the two groups to evaluate the complications in both groups.

There were 65% males and 35% females in these groups. The mean age was 31.73 ± 10.73 in the range of 18-56 years. In these patients and there were differences in early complications which include Fever, Hematuria, post operative ileus, surgical site infection, Urinary leakage, Deep venous

thrombus/pulmonary edema whereas Fecal leakage and ruptured augmented bladder were constant in both groups.

Out of 20 patients in each group, Fever in group A 14(70%) and in group B 17(85%) and (P=0.451), hematuria in group A 2(10%) and in group B 3(15%) and (P=0.999), post operative ileus in group A 13(65%) and in group B 18(90%) and (P=0.127), surgical site infection in group A 9(45%) and in group B 13(65%) and

(P=0.202), Urinary leakage in group A 3(15%) and in group B 5(25%) and (P=0.695), deep venous thrombus/pulmonary edema in group A 1(5%) and in group B 2(10%) and (P=1.000), whereas rupture augmented bladder and fecal leakage were constant in both groups.

In this study, 62.50% patients belong to age group 18-30 years, 20% patients lies in 31-43 years, 17-50% were in 44-45 years.

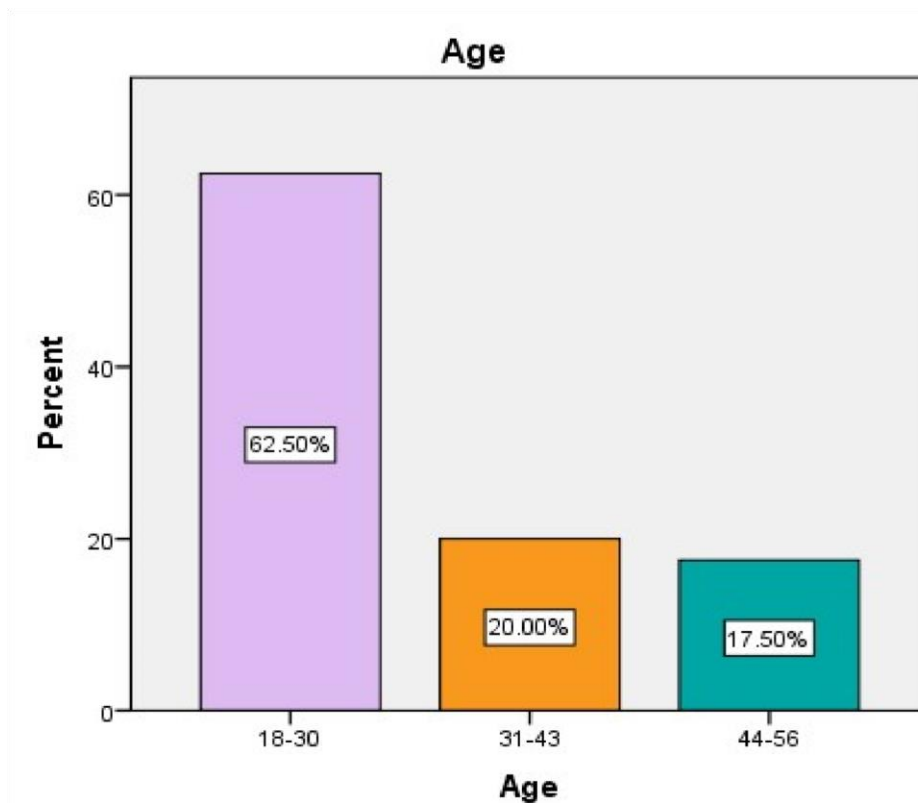


Figure No 1: Ages Of Patients (n=40)

In this study, 1% patient belongs to CKD stage 2, 35% patients lies in CKD stage 3, 40% were in CKD stage 4 and rest of 20% patients belongs to CKD stage 5

Table No 1: Chronic Kidney Disease Stages (n=20)

Stages n=20 (%)	
Stage 2	1 (5%)
Stage 3	7 (35%)
Stage 4	8 (40%)
Stage 5	4 (20%)

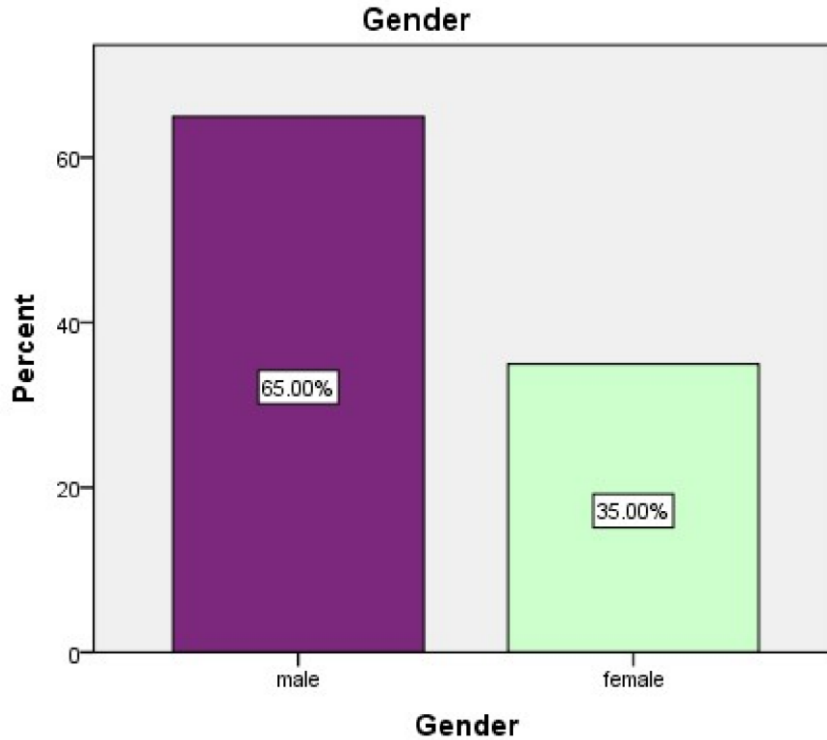


Figure No 2: Gender of patients (n= 40)

Table No 2: Complication Comparisons of Normal Renal Function Patients And Impaired Renal Function Patients

Variables	Group A and Group B n= 20 (%)	n= 20 (%)	p value
Early complications			
Fever	14(70%)	17(85%)	0.451
Hematuria	2 (10%)	3 (15%)	0.999
Post operative ileus	13 (65%)	18 (90%)	0.127
Surgical site infection	9 (45%)	13 (65%)	0.202
Urinary leakage	3 (15%)	5 (25%)	0.695
Fecal leakage	–	–	–
Rupture augmented bladder	–	–	–
Deep venous thrombus/ pulmonary edema	1 (15%)	2 (10%)	1.000

DISCUSSION:

Since the first operation carried out by von Mikulicz in 1889, augmentation cystoplasty has gained popularity as an important armamentarium in the management of patients with neuropathic bladder, small contracted bladder or detrusor overactivity. Conservative treatment including intermittent catheter, pharmacological treatment and intravesical

botulinum toxin have led to a reduction in carrying out this comparatively more invasive procedure. The safety and effectiveness of these procedures are undeniably more appealing to urologists and patients. The primary outcomes of augmentation cystoplasty include an increase in bladder capacity, improvement in bladder compliance and protection of the upper urinary tract. This is a very promising and encouraging

result, which provides a convincing conclusion of the effectiveness of augmentation cystoplasty in protecting renal function in patients who had a high-pressure unstable bladder before surgery. Early complications of augmentation cystoplasty are well described in this study.

There is great differences in renal function outcomes with both renal deterioration and improvement have seen. Many of patients had preserved or improved renal function while some of them have deteriorates in renal function in this study, it represents the early complications in both group's normal renal function and impaired renal function after ileocystoplasty in adult's population. The renal function assessed by calculating eGFR MDRD formula. This helps us to know CKD stages of impaired group.

Bulent Cetinel et al reported the most frequent early complications was prolonged postoperative ileus, wound infection (5%-6.4%), bleeding requiring reoperation (0%-3%) and thrombo-embolic complications (1%-3%) and in another studies.

Hematuria is present in 33% of patients after augmentation cystoplasty.²⁰ Shekarriz et al had 2 of 133 patients (1.5%) develop a urinary leak on post operative days.²¹ Flood et al evaluate early complication in 116 patients and found 17 patients with urinary leaks. Whereas 5-12.8% patients have develop rupture augmentation bladder, the post operative deep venous thrombus/ pulmonary edema was as high as 7.1% in 185 patients.²²

The study which we conducted on the total sample of 40 patients in which 20 are group A and 20 are in group b; Group A include normal renal function patients and Group B include impaired renal function patients. According to our study the mean ages of these patient 31.73 ± 10.73 in the range of 18-56 years. The difference in early complications rates was observed. Out of 20 Fever in group A (70%) and in group B (85%), Hematuria in group A (10%) and in group B (15%), Post operative ileus in group A (65%) and in group B (90%), Surgical site infection in group A (45%) and in group B (65%), Urinary leakage in group A (15%) and in group B (25%), Deep venous thrombus/pulmonary edema in group A (5%) and in group B (10%) where as Fecal leakage and Ruptured augmented bladder has not occur in both groups.

In contrast to other studies, our finding of early complications rates after augmentation cystoplasty are slightly different because there were no comparison

was seen in past studies as compared to our study and the ratio of early complication was higher in impaired renal functioning group as compared to normal renal functioning group.

CONCLUSION:

Augmentation cystoplasty with ileum remains the current gold standard surgical treatment for many patients with end-stage bladder diseases. Ileocystoplasty is a procedure with long-term durability and high rates of patient satisfaction but not without risk of complications. In our study the higher risk of early complications were seen in impaired renal function patients as compare to normal renal function patients. According to our findings those patients with elevated baseline creatinine levels after augmentation are at higher risk to develop early complications in postoperative phase.

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