
**E-ISSN: 2616-3470**
**P-ISSN: 2616-3462**

www.surgeryscience.com
2019; 3(4): 104-106
Received: 22-08-2019
Accepted: 26-09-2019

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# A study on evaluation of frequency of urogenital tract abnormalities associated with congenital anorectal malformations

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**DOI:** https://doi.org/10.33545/surgery.2019.v3.i4b.226

**Abstract**
**Background & Aim:** Urogenital anomalies are common associated anomalies in anorectal malformations and are major contributory factor for high morbidity and mortality in anorectal malformation. There is a intense need to search out the factors responsible for high association of urogenital anomalies in anorectal malformation A prospective study was conducted in the Department of pediatric surgery, Guntur Medical college & Government Hospital. The objective of this study was to review the incidence of urogenital anomalies associated with anorectal malformation in our set-up.
**Results:** Of the 90 patients with anorectal malfonnation, 52(57.78%) were male and 38(42.22%) were female. Ultra sonogram of abdomen was normal in 51(56.67%o) patients and abnormal in 29 patients (32.22%). High anorectal anomalies are most commonly associated with urological and genital anomalies. Of the 52 male patients 26(50%>) had urological and 10 (19.23%>) of them had genital anomalies. 22 of 90(24.44%) patients had vesicoureteric reflux which the most common urologic anomalies. 6(6.67%) of the 90 patients had hypospadias which is commonest among other genital anomalies. As both urologic and genital anomalies are more commonly observed in males there is a sexual preponderance. Hypospadias is the most common genital anomaly associated with anorectal malformations. VCUG when performed in all cases of anorectal malformations detected vesicoureteric reflux in 25cases out of which 10 were normal on Ultrasound. Early detection and management of these anomalies dictates the overall prognosis of a child with anorectal malformation.
**Conclusion:** In the present study we conclude all cases of anorectal malformations should undergo VCUG to detect urological anomalies which may go unnoticed on USG. Patients with urogenital anomalies require careful assessment and timely intervention for better out come.

**Keywords:** Anorectal malformation, Urogenital, Hypospadias

## Introduction
Anorectal malformations are a complex group of malformations diagnosed at birth because of absent or ectopic anus [1]. There is variable data; however the incidence is approximately 1:5000 in live births. Genitourinary anomalies occur frequently in the patients with congenital anorectal malformation. Urinary tract problems are common in these patients with a reported incidence of 26% to 50% in several large series [1, 2]. Most of the genital anomalies are visible on clinical examination, but urological anomalies need investigations for their detection [3]. The purpose of this study was to evaluate the frequency of coexisting urinary malformations in a single population of patients with imperforate anus in our children's medical centre.

## Materials and Methods
The present prospective study was done in a single unit on ninety patients with anorectal malformation, who presented for review to Government General Hospital/ Guntur Medical College, Guntur from September 2014 to March 2017.Of these, 52 were male and 38were female patients. All patients underwent a detailed clinical examination, evaluation and management which were done in the neonatal period. The associated urogenital anomalies were noted. The patient′s sex, anorectal lesion level and the presence of urinary tract, genital or spinal anomalies were recorded. Level of anorectal lesion was determined by radiographic evaluation. Renal ultrasound or intra venous pyelography (IVP) and Voiding cystouretherography (VCUG) were performed for urinary tract malformations in all cases with intermediate or high level

anorectal lesions but not in low level anal lesion. In patients with low level imperforate anus, genital malformations were defined as any anomaly of the penis, testis or scrotum in boys and vagina, cervix or uterus in girls.

## Methodology

**Table 1:** No. Of Anomalies on USG and VCUG out of 90 patients

| Investigation | No. Of anomalies detected | Percentage |
|---|---|---|
| USG | 29 | 32.22% |
| VCUG | 25 | 44.83% |

In 29 patients USG was abnormal. VCUG was performed in all patients irrespective of USG findings. In 10 patients in whom USG was normal VCUG detected VUR. Hence a total of 39 (29+10) patients out of 90, evaluated had urologic anomalies Associated urologic malformations in 39 (43.33%) of 90 patients with anorectal malformations.

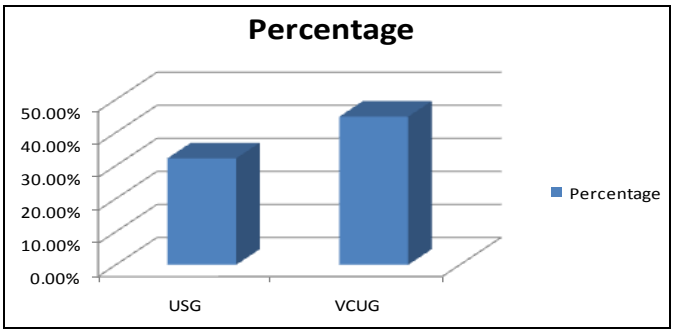


**Fig 1:** Show No. Of Anomalies on USG and VCUG out of 90 patients

**Table 2:** Associated Urologic Malformation in 39 (43.33%) of 90 patients with anorectal malformation

| Malformation | Number | Percentage |
|---|---|---|
| Vasico uretral reflux | 25 | 27.78% |
| Urethral renal agenesis | 4 | 4.44 |
| Unilateral ectopia | 2 | 2.22 |
| Multi cystic Dyslapsia | 3 | 3.33 |
| Crossed ectopia with fusion | 1 | 1.11 |
| Posterior Urethral Valves | 2 | 2.22 |
| Duplex system | 2 | 2.22 |
| Hydro Nephrosis | 5 | 5.55 |

We detected urological anomalies in 39 patients by performing USG and MCUG. The most common anomaly was VUR. In some patients (n=5) more than one anomaly was associated (posterior urethral valves and VUR in two, duplex system and VUR in two hydronephrosis and VUR in one).

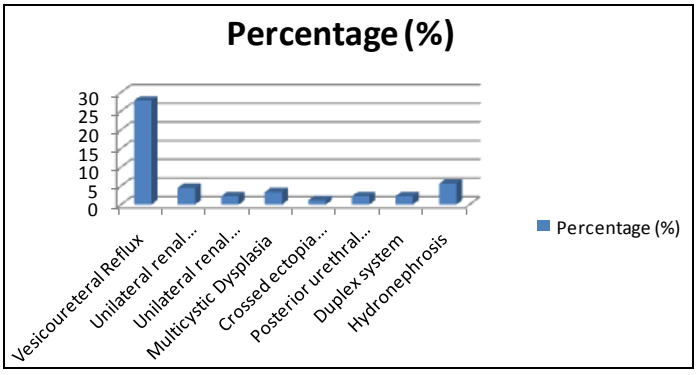


**Fig 2:** Show Associated Urologic Malformation in 39 (43.33%) of 90 patients with anorectal malformation

**Table 3:** Associated genital malformations in 13 of 90 (14.44%) patients with anorectal malformation

| Sex | Malformation | Number | % |
|---|---|---|---|
| Male | Cryptorchidism | 3 | 3.3% |
| | Hypospadias | 6 | 6.67% |
| | Scrotal bifida | 1 | 1.11% |
| Female | Cloaca | 3 | 3.33% |

Hypospadias is the commonest genital anomaly. Penoscrotal hypospadias was commonly detected.

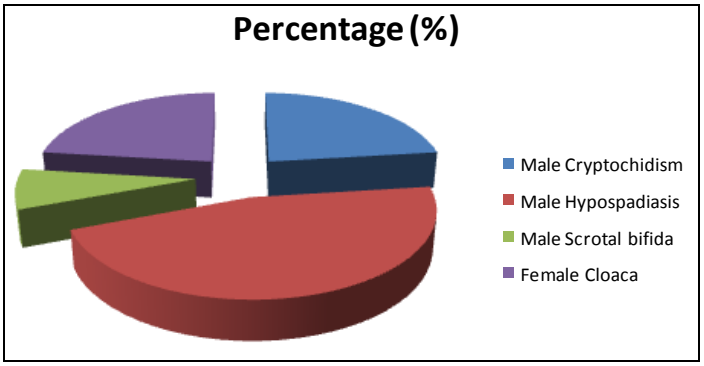


**Fig 3:** Show Associated genital malformations in 13 of 90 (14.44%) patients with anorectal malformation

**Table 4:** Frequency of associated urogenital anomalies in 90 patients with anorectal malformation according to sex

| Sex | Number | Urologic anomalies | Genital anomalies |
|---|---|---|---|
| Male | 52(57.78%) | 27(51.92%) | 10(19.23%) |
| Female | 38(42.22%) | 12 (31.58%) | 3(7.89%) |
| Total | 90 | 39(43.33%) | 13(14.4%) |

Urological and genital anomalies are more common in male patients. In our study 27 of 52 male patients (51.92%) with anorectal malformation had urological abnormalities. In females 12 of 38 patients (3L58%) have urological anomalies. Males are more likely to have associated urological anomalies in ARM.

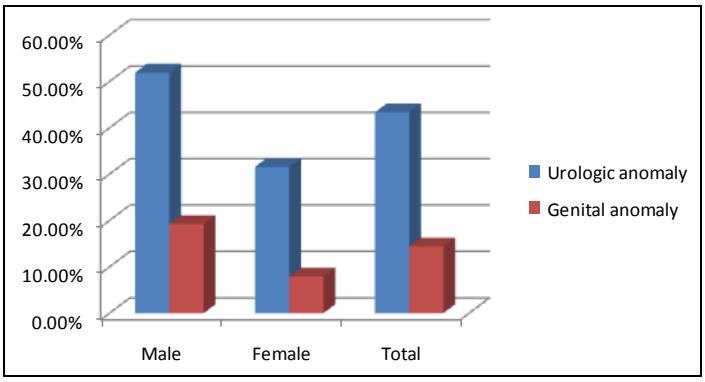


**Fig 4:** Show Frequency of associated urogenital anomalies in 90 patients with anorectal malformation according to sex

**Table 5:** Frequency of associated urogenital anomalies in 90 patients with anorectal malformations according to level of deformity

| Level of deformity | Number | Urologic anomalies | Genital anomalies |
|---|---|---|---|
| High | 38(42.22%) | 20(22.22%) | 10(11.11%) |
| Intermediate | 22(24.44%) | 04(4.44%) | 2(2.22%) |
| Low | 30(33.33%) | 15(16.67%) | 1(1.11%) |
| Total | 90 | 39(43.33%) | 13(14.44%) |

Urological and genital anomalies are more commonly seen in high ARM in our study.

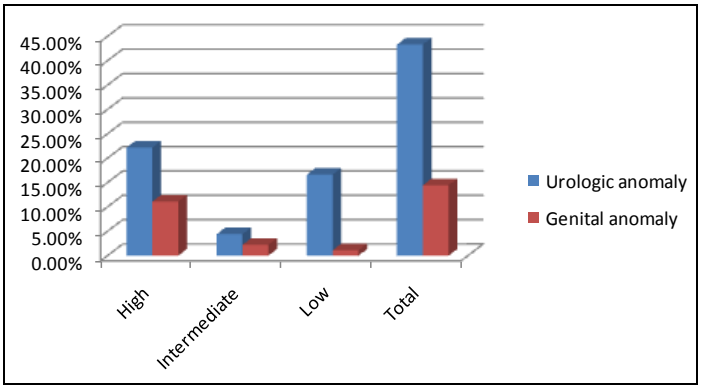


**Fig 5:** Show Frequency of associated urogenital anomalies in 90 patients with anorectal malformations according to level of deformity

Of the 90 patients with anorectal malfonnation, 52(57.78%) were male and 38 (42.22%) were female. Ultra sonogram of abdomen was normal in 51 (56.67%o) patients and abnormal in 29 patients (32.22%). High anorectal anomalies are most commonly associated with urological and genital anomalies. Of the 52 male patients 26(50%>) had urological and 10 (19.23%>) of them had genital anomalies. 22 of 90 (24.44%) patients had vesicoureteric reflux which the most common urologic anomalies. 6 (6.67%) of the 90 patients had hypospadias which is commonest among other genital anomalies. As both urologic and genital anomalies are more commonly observed in males there is a sexual preponderance.

## Discussion

The association of genitourinary anomalies with imperforate anus has been recently reviewed. In general, incidence of associated genitourinary anomalies ranging from 26% to 50% has been reported with an increased incidence of high (Supralevator) as compared to low (infralevator) lesions [1, 3, 4]. VUR and renal agenesis are the most common associated urinary tract anomalies with imperforate anus In our study USG abdomen and VCUG was performed on all patients. In 43.33% of patients USG was abnormal. VCUG was abnormal in 28.73% of patients, The commonest anomaly detected in our study was VUR. 38 units of VUR were detected by VCUG 94.7% were grade Sin 10.

In the present study, we found that Urological and genital anomalies are more common in male patients. In our study 27 of 52 male patients (51.92%) with anorectal malformation had urological abnormalities. In females 12 of 38 patients (3L58%) have urological anomalies. Males are more likely to have associated urological anomalies in ARM. Urological and genital anomalies are more commonly seen in high ARM in our study. The findings of this study are similar to urinary tract anomalies reported in other studies [1, 2, 5]. The incidence of urinary tract anomalies increased with a higher level of anorectal malformation [6].

In the present study, High anorectal anomalies are most commonly associated with urological and genital anomalies. Of the 52 male patients 26(50%>) had urological and 10 (19.23%>) of them had genital anomalies. 22 of 90 (24.44%) patients had vesicoureteric reflux which the most common urologic anomalies. 6 (6.67%) of the 90 patients had hypospadias which is commonest among other genital anomalies. As both urologic and genital anomalies are more commonly observed in males there is a sexual preponderance.

In our study hypospadias was the commonest genital anomaly, seen in 6.67% of patients.

In other study, hydronephrosis and renal agenesis were the most common abnormalities of the upper urinary tract, and Neurovesical dysfunction is a frequent finding in children with anorectal malformations [7]. We found hydronephrosis and renal agenesis as two common of the upper urinary tract abnormalities. Neurovesical dysfunction commonly is associated with Sacrospinal deformities. Some authors recommend evaluation of all patients with MRI, because spinal cord anomalies may occur without obvious Sacrospinal anomalies [8]. Urodynamic studies (UDS) are reserved for those children with either a deformity of the spine or a spinal cord defect [7]. Patients the USG was normal but VUR was detected on VCUG. Grade 5 VUR was commonly detected. Six patients with high ARM who had normal USG were found to have VUR.

The previous studies reported that, reported 42% of VUR in patients with imperforate anus investigated by VCUG in both sonographically normal and abnormal. The other findings revealed that hypospadias was most common genital anomaly, seen in 4.09% of patients [9].

## Conclusion

All patients with imperforate anus should be investigated for urogenital and spinal anomalies. Every effort should be undertaken to detect the associated urogenital anomalies, so that a better outcome can be expected in anorectal malformation. There is also an intense need to search for predisposing factors responsible for associated anomalies.

## Acknowledgement

The authors thankful to Department of Paediatrics and Surgery for providing all the facilities to carry out this work.

**Conflict of Interest:** None

**Ethical approval:** Taken from Institutional Ethics Committee.

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