Original Article

Role of Intravenous Urography and Ultrasonography in the Management of Vesicovaginal Fistula (VVF)

Ashraf Ali Jafari, Muhammad Akmal, Muhammad Irfan Munir, Ghluam Mahboob Subhani, Safdar Hassan Javed

ABSTRACT

Background: It has been a matter of great controversy whether the sonography (USG) and intravenous urography (IVU) both are mandatory for the evaluation of hydronephrosis and hydro ureter in female patients having urinary fistulae. So we planned to conduct a study on this subject. **Objectives**: To compare the sensitivity of IVU and USG in showing the degree of Hydro nephrosis and hydro ureter in the patients having VVF. **Study Design:** Prospective study. **Place and Duration of Study:** Department of Urology Punjab Medical College /Allied Hospital Faisalabad from January 2013 to October 2014. **Methodology:** Thirty consecutive female patients suffering from urinary incontinence who presented in outpatient department and were diagnosed to have VVF were taken for study. Patients with urge incontinence, patients with malignancy, patients who underwent surgery or received radiation were excluded from this study. Informed consent for study purpose and surgery were taken. USG and IVU were done in every patients to find the hydronephrosis or hydro ureter. **Results:** Twenty seven out of thirty patients who had not hydronephrosis on USG, they also had not hydronephrosis or hydro ureter on IVU, while only three patients had hydronephrosis on USG had also hydronephrosis on IVU. **Conclusion:** This study concluded that USG and IVU have almost equal sensitivity in finding hydro nephrosis or hydro ureter in patients having VVF. Therefore, any one of them can suffice to find out hydronephrosis. IVU is an invasive procedure and have the risk of reaction to contrast material and exposure to radiations. USG is cost effective, non-invasive and hence can be used in place of IVU.

Key words: Vesicovaginal fistula, intravenous Urography and ultrasound.

INTRODUCTION

Vesicovaginal fistula is an abnormal communication between the mucosa of urinary bladder and that of vagina. The condition is characterized by persistent leakage of urine through vagina resulting in perineal wetness, excoriation and pain. The pervasive urinary odour have a negative impact on the quality of life of affected woman[1]. If the condition is not corrected promptly the affected woman may be abandoned by her community, close relatives and even her husband.[2]

Corresponding Author:
Dr. Ashraf Ali Jafari
Assistant Professor, Urology
PMC/Allied Hospital, Faisalabad
Tel. +92 300-7630150
E-mail: aajafari1@yahoo.com

V.V.F has following etiologies:-

Obstetric causes:

Prolonged labour, obstructed labour, instrumentation during labour, illegal abortion, lower segment caesarean section (L.S.C.S).

Gynecological causes:

Pelvic surgical procedures, abdominal hysterectomy, vaginal hysterectomy.

Pathological causes:

Carcinoma of cervix may erode posterior wall of bladder leading to VVF. Radiotherapy for carcinoma of cervix may lead to VVF formation.

In most developing countries, over 90% of fistulae occur due to obstetric causes, obstructed labour being the major cause. In developed countries, 70% fistulae follow pelvic surgery, hysterectomy making the major share[3]. The true incidence of VVF in the developing world is unknown because of the difficulties in obtaining accurate data as

many patients do not report to any hospital to seek medical treatment.

Presentation:

Patients with urogenital fistulae are said to present with continuous urinary leakage. Patients having VVF have no desire to void where as patients with UVF have leakage of urine and also the desire to void.

Investigations and Diagnosis:

In order to diagnose a urogenital fistula, the leaking fluid must be confirmed to be the urine. The leakage needs to be definitely extra urethral and the site of leakage has to be identified.

Phenazopyridine is an oral formulation of an orange dye which is excreted in the urine. It is used to stain the urine and hence confirm that the leaking fluid is urine. However, this dye is not available in market now a days. Indigo carmine can be used intravenously as an alternative.

Various dyes are helpful in diagnosis of urinary fistulae. The presence of a VVF may be confirmed by instillation of a vital dye (methylene blue) into the bladder per urethra and observing leakage of this dye into vagina. Small or occult fistulae maybe identified in this fashion.

If leakage of a clear fluid continues after instillation of the dye into the bladder, a ureteric fistula is likely. This is most easily confirmed by a two dye test using phenazopyridine to stain the renal urine and methylene blue to stain the urine in the urinary bladder. Three swab test is not recommended because it gives a less clear distinction between urethral and extra urethral leakage and precludes the presence of multiple fistulae. Cystoscopy can confirm the presence and exact location of the fistula. On vaginal examination VVF may be visualized as well as palpable and urinary leakage may be visible.

Although intravenous pyelography is an insensitive investigation for the diagnosis of a VVF, knowledge of status of upper urinary tract may have a significant influence on the treatment measures used and should be looked upon as an essential investigation for any suspected or confirmed urinary fistula. Intravenous pyelography is used to find out co-existing UVF or Ureteral obstruction[4].

UVF can be seen in as much as 10% cases as an association of VVF[5]. When a ureter is involved in the margin of the VVF, intravenous pyelography may demonstrate a standing column of contrast material within the ureter, extravasation of contrast around distal ureter, hydronephrosis or hydro ureter[6].

Ultrasono graphy -can also give this information of hydronephrosis or hydro ureter and can be used as an alternative for intravenous pyelography.

However, in distal ureter USG has a poor role in finding hydro ureter.

Background of present study:

On review of literature it has been found that in many national as well as international studies on VVF, intravenous pyelography and ultrasonography both have been used to evaluate the status of upper urinary tract. It has been a matter of great controversy whether the sonography (USG) and intravenous urography (IVU), both are mandatory for the evaluation of hydronephrosis in every case of vesicovaginal fistula. So we planned to conduct a study on this subject.

Objectives: To compare the sensitivity of IVU and USG in showing Hydronephrosis and hydro ureter in patients having VVF.

PATIENTS AND METHODOLOGY

Design of study: Prospective cross sectional study.

Duration of study: January 2013 to October 2014.

Setting: - Study was conducted at Department of Urology PMC/Allied Hospital Faisalabad.

Inclusion Criteria: Patients presenting in OPD with the complaint of incontinence and history suggestive of VVF were evaluated for diagnosis. Patients diagnosed to have VVF were included in this study.

Exclusion Criteria: Patients having stress/urge incontinence, Patients having VVF due to pathological causes, patients having previous surgery or radiation were excluded from the study.

After admition, detailed history was taken from the patients. General physical examination of patients was performed. Baseline investigations like blood and urine complete examination, blood sugar (random and fasting), X-ray chest and E.C.G. were performed. Abdominal Ultrasonogrphy and Intravenous urography were done in every patient to find out hydronephrosis

and hydroureter. Informed consent was taken for study purpose and surgical repair.

Examination under anesthesia was done. Vaginoscopy and cystoscopy was done to find the site and size of fistula. Leakage of urine through fistula tract was quite evident in case of VVF. Smaller fistulae can be diagnosed with instillation of methylene blue through Foley catheter into the urinary bladder and its leakage into the vagina. Low lying fistulae were repaired through vaginal approach and high fistulae were repaired through abdominal approach.

Data Entry: -

Special proforma was made showing particulars of the patients, history related to the cause, findings of USG and IVU, findings of cystoscopy and outcome of surgical repair.

RESULTS

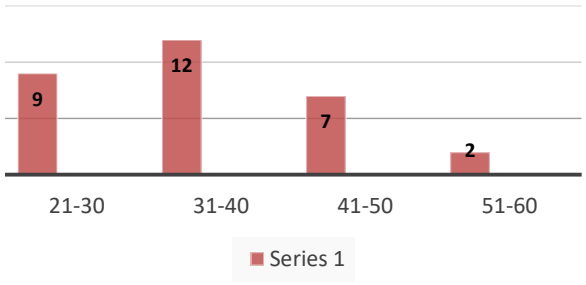
Total thirty patients were included in this study. Age groups of patients are shown in table 1 & chart 1.

Patient Data:

Table 1: Age groups of patients.

Age Group (Years)	Number of Patients
21-30	Nine
31-40	Twelve
41-50	Seven
51-60	Two

Fig 1: showing age groups of patients.

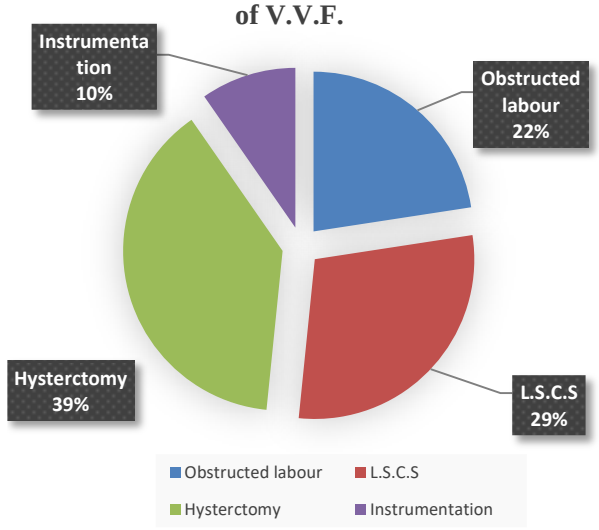


Causative factors of VVF are shown in table 2 & pie graph

Table 2: Causative factors of VVF

Etiology	Number of Patients
Obstructed labor	Seven
L.S.C.S	Nine
Hysterectomy	Twelve
Instrumentation	Two

Fig 2: Pai graph showing causative factor of V.V.F.



Twenty two (73.33%) patients had supra trigonal fistulae and eight (26.67%) patients had infratrigonal fistulae.

Twenty-seven out of thirty (90%) patients had no hydronephrosis or hydro ureter on ultrasonography. Same results were obtained on performing intravenous urography of those patients.

Three (10%) patients had hydronephrosis both on USG and I.V.U.

These results indicated that USG and I.V.U. have equal sensitivity in detecting hydronephrosis in patients with VVF.

DISCUSSION

On review of literature it has been found conventional to do USG and IVU to detect the presence of hydronephrosis or hydro ureter. In majority of studies on VVF available in national and international literature both modalities have been used simultaneously. Only in limited number

of studies only one of these modalities is used. In spite of the wide use of these modalities, there is little in the literature on the comparison of their sensitivities in detecting hydronephrosis or hydroureter.

Rajkumar Mathur [5] et al in their study in India "Urogenital fistulae", a prospective study of 50 cases at a tertiary care hospital have found IVU of great help to diagnose urogenital fistulae. However no comparison between findings of IVU and USG was done.

P. Hilton[6] during his study" vesico-vaginal fistulas in developing countries" proved that although intravenous urography is a particularly insensitive investigation for the diagnosis of VVF, assessment of upper urinary tract may have a significant influence on treatment measures applied.

Mumtaz Rasool [7] and his colleagues in their study on VVF at B.V. Hospital, Bahawalpur, used ultrasonography abdomen for evaluation of upper urinary tract. IVU was used only in those patients whose USG showed hydronephrosis and hydro ureter. However, no comparison of the sensitivities of the two modalities was done. Similarly Rafique Ahmed Sahito [8] et al, in a study of 30 cases of VVF used both USG and IVU for the evaluation of their patients but had no comparison of their sensitivities.

In a study on vesicovaginal fistula conducted by Prof. Dr. Abdur Rasheed Shaikh[9] and his colleagues at department of urology, Chandka Medical College Teaching Hospital and Almas Medical Centre Larkana only ultra sonography was performed as a study tool for evaluation of upper urinary tract. In contrary to this, Yasmin Rashid et al [10] conducted a study on iatrogenic vesicovaginal fistulae in Lady Willingdon Hospital Lahore and performed only IVU and not USG.

In a study on VVF in lady Reading Hospital, Peshawar conducted by Tanveer shafqat[11] and his colleagues, intravenous urography was done in selected cases.

Mathur R et al[12]. Performed IVU for evaluation of patients having urogenital fistula in a prospective study of 50 cases at a tertiary care hospital in Madhya Pradesh, India.

In a comparative study in Turkey and Niger by Savan K[13]et al. intravenous urography was applied to patients with suspected urogenital fistula to confirm the fistulous tract.

I. Romics *et al* [14]. in a series of 10 patients with complex VVF in department of urology, Semmelweis University, Budapest, Hungary, performed both USG and IVU to find out upper urinary tract dilatation but like many other studies no comparison between the sensitivities of the two modalities was done.

In a prospective study of 28 patients carried out in Nigeria by Victor A. Adetiloye et al [15] IVU and USG were used to find the fistulous tract. USG showed superiority on IVU in this regard. However no comments were given about status of upper urinary tract in this study.

In an original article "trans-vaginal sonographic evaluation of vesicovaginal fistula" by Saba Sohail and Kausar Jehan Siddiqui [16], the sensitivity of transvaginal ultrasound in the detection of VVF was discussed but no information was provided about hydro nephrosis or hydro ureter.

In a review article" Diagnosis and Management of VVF" by Kathryn M Clement and Paul Hilton [17] USG and IVU were used as imaging techniques. They claimed IVU to be an insensitive investigation in the diagnosis of VVF. They have declared that dye studies remain the investigation of the first choice for diagnosis and ultrasound is not the investigation of first choice.

Keeping this thing in view we conducted the present study in which both USG and IVU were used simultaneously to diagnose the status of upper urinary tract. We compared the results obtained from each of these modalities. Interestingly the results obtained from each modality were almost similar. IVU revealed hydro nephrosis or hydro ureter only in those patients which were shown to have hydronephrosis or hydro ureter with the help of USG. There is no need to use both USG and IVU to get the same information about upper urinary tract. Only one of the two modalities can serve the purpose. Use of ultrasound has advantage over IVU as no radiation is involved and adverse reactions to contrast material are obviated. USG is noninvasive, cost effective and easily available diagnostic tool.

CONCLUSION

First we can use USG to evaluate the status of upper urinary tract. If no hydronephrosis or hydro ureter is detected, there is no need to do IVU. If there is hydronephrosis / hydro ureter on USG, only then we should perform IVU to confirm the findings.

REFERENCES

1. Danso KA. Genital tract fistulas. In; EY Kwawukume, EE EMUVEYAN (Eds). Comprehensive gynecology in the tropics. Accra: Graphic Packing, 2005; 174-181.
2. Karshinia JA, Otubu JAM. Fistula. In:A Agboola (Ed.). Textbook of obstetrics and gynecology for medical students. Nigeria: Heinemann Educational, 2006; 39-51.
3. Garthwaite M, Harris N. Vesicovaginal fistulae. Indian J Urol. 2010; 26: 253-256.
4. Muhammad Shuja Tahir, Mahnaz Roohi. Vesicovaginal fistula (VVF). Professional Med J Mar 2009; 16(1):1-11.
5. Rajkumar Mathur, Nitin Joshi, Gaurav Aggarwal et al. Urogenital fistulae: A prospective study of 50 cases at a tertiary care hospital. Urol Ann 2010; 2(2):67-70.
6. P. Hilton. Vesico-vaginal fistulas in developing countries. International Journal of Gynecology and Obstetrics 2005; 82:285-295.
7. Rasool M, Tabassum SA, Mumtaz F. Vesicovaginal fistula repair; urologist's experience at Bahawalpur. Professional Med J 2006; 13:445-452.
8. Sahito RA, Suhail MA, Memon, Shaikh F. Per abdominal repair of Vesico-vaginal fistula surgical experience of 30 cause. MC 2012; 18: 87-90.
9. Shaikh AR, Shaikh S, Shaikh SN, Shaikh AH, Memon AA, Shaikh NA, Shaikh AF. Repair of vesicovaginal fistula (abdominal verses vaginal route). Professional Med J 2011; 18:354-360.
10. Rashid Y, Majeed T, Majeed Naeem et al. Iatrogenic vesicovaginal fistula JCPS 2010; 20: 436-438.
11. Shafqat T, Faiz NR, Haleemi M. Profile and repair success of vesicovaginal fistula in NWFP. JPMI 2009; 23:99-101.
12. Mathur R, Joshi N, Aggarwal G et al. Urogenital fistulae: A prospective study of 50 cases at a tertiary care hospital. Urol Ann.2010; 2:67-70.
13. Savan K, Ekin M, Kupelioglut L, Oral S, and Yasar L. Surgical repair of genitourinary fistulae: comparison of our experience at Turkey and Niger. Arch Gynecol Obstet.2010; 282(6)-649-53.
14. Romics I, Kelemen Zs and Fazakas Zs. The diagnosis and management of vesicovaginal fistulae. BJU International 2002; 89:764-768.
15. Victor A. Adetiloye, MB, FMCR, FWACS, Francis O. Dare, MB, FMCO & G. Obstetric Fistula: Evaluation with Ultrasonography. J Ultrasound Med 2000; 19:243-249.
16. Saba Sohail & Kausar Jehan Siddiqui. Trans-vaginal Sonographic Evaluation of Vesicovaginal Fistula. J Pak Med Assoc 2005; 7:292-294.
17. Clement K M & Hilton P. Diagnosis and management of vesicovaginal fistula. The Obstetrician G Gynecologist October 2001; 03:173-178.

AUTHORS

- **Dr. Ashraf Ali Jafari**
  Assistant Professor, Urology
  PMC / Allied Hospital, Faisalabad
- **Dr. Muhammad Akmal**
  Assistant Professor, Urology
  PMC / Allied Hospital, Faisalabad
- **Dr. Muhammad Irfan Munir**
  Assistant Professor, Urology
  PMC / Allied Hospital, Faisalabad
- **Dr. Ghulam Mahboob Subhani**
  Associate Professor, Urology
  PMC / Allied Hospital, Faisalabad
- **Prof. Dr. Safdar Hassan Javed**
  Professor of Urology
  PMC / Allied Hospital, Faisalabad

Submitted for Publication:	17-08-2014
Accepted for Publication: After minor revisions	12-10-2014