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PJBS

ISSN 1028-8880

Pakistan Journal of Biological Sciences

ANSInet
Asian Network for Scientific Information
308 Lasani Town, Sargodha Road, Faisalabad - Pakistan

Pakistan Journal of Biological Sciences 16 (9): 426-430, 2013
ISSN 1028-8880 / DOI: 10.3923/pjbs.2013.426.430

Lich-gregoir Procedure in Treatment of the Vesicoureteral Reflux

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Abstract: Vesicoureteral reflux is a major problem in childhood affecting 1% of all children. There are various surgical methods for vesicoureteral reflux treatment. Current study evaluates effectiveness and success rate of the Lich-gregoir procedure in treatment of the vesicoureteral reflux. In a descriptive-analytical study, 32 children with 47 reflux unit underwent Lich-gregoir anti-reflux procedure in Imam Reza and Amir-al-Momenin Hospitals, Tabriz between March 2008 and August 2011. Surgery outcome and success rate, sonographic findings and complications rate were recorded in follow-up. Patients mean age was 5.85±3.81 years. 28.1% were male and 71.9% were female. Reflux was unilateral in 53.1% and bilateral in 46.9%. Vesicoureteral reflux grade I to V was in one, 1, 13, 22 and ten patients, respectively. Voiding Cystourethrogram (VCUG) findings were abnormal in all cases before operation. Surgery success rate in first 6 months was 95.7% and was 100% in 8 months after operation. Hydronephrosis disappeared after operation in all cases. Complication occurred in 2 cases (6.25%) with bilateral reflux including urinary intention and lymphocele. Lich-gregoir anti-reflux procedure technique is accompanied with higher success rate, low complication and hydronephrosis improvement and is an appropriate treatment for vesicoureteral reflux in children.

Key words: Vesicoureteral reflux, Lich-gregoir technique, outcome, success

INTRODUCTION

Vesicoureteral Reflux (VUR) is a main problem during childhood effecting about 1% of all children and 25-45% of those referring with acute pyelonephritis. (Goldust *et al*., 2013a; Ziesel *et al*., 2012) Reflux of vesicoureteral is detected through imaging and urethrocystoscopy methods. Mild cases of VUR are automatically recovered. In most acute cases, there is a combination of VUR, recurrent pyelonephritis and kidney scar result in kidney dysfunction and finally, renal insufficiency (Callewaert *et al*., 2012; Goldust *et al*., 2013b). There is not any guideline. When doctors are waiting to automatically recovering of reflux for VUR grades I and II, a long-term prophylaxis is recommended as a primary treatment to prevent infection of urinary system (Mohebbipour *et al*., 2012; Goldust *et al*., 2012; Whang *et al*., 2011). In fact, International reflux study in children has reported high rate of automatic recovery (about 80%) for mild and non-delayed VUR (Goldust *et al*., 2013c; Lopez *et al*., 2011). However, prophylaxis may be needed by the patients for a long term. It has been recommended to stop prophylaxis treatment in those children with resistant reflux. There is not any case study supporting the subject (Goldust *et al*., 2013b; Nouralizadeh *et al*., 2010). Automatic recovery of high grade reflux was often rare (52%) during 10 years of prevention from urinary system infection (Goldust *et al*., 2013d; Lopez and Varlet, 2010). American Urological Association Reflux guidelines state that more than 50% of one-lateral and 90% of bilateral grade IV VUR are left intact after 5 years of treatment with prophylaxis (Onol *et al*., 2009; Vafaee *et al*., 2012). Surgical intervention is the golden standard of treatment for high grade VUR with success rate of 95%. However, surgery has some complications such that obstruction is seen in 0.3-9.1% and VUR remains in grade V VUR in 20% of cases after treatment (Martinez-Mier *et al*., 2009; Sadighi *et al*., 2011; Goldust *et al*., 2011). There are different treatment methods to treat vesicoureteral reflux including medical and surgical methods. More than half of the primary refluxes of children can be controlled using non-surgical ways. But, other cases of reflux require surgical interventions (Goldust *et al*., 2012; Zubieta and Lopez, 2008). Anti-reflux surgical operations have indications in the following cases: (1) Remaining the reflux and non-sterile urine despite of medical treatment, (2) Suffering from acute pyelonephritis despite of medical

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treatment and chronic consumption of antibiotics, (3) Increasing renal scar rate despite of consumption of antibiotics and (4) Adolescent girls suffering from reflux and their reflux has not treated until their marriage (Milan *et al*., 2011; Pan *et al*., 2008). Endoscopic treatment of reflux has been considered during recent years. Although injection around ureter opening has been introduced as an alternative method to treat reflux, an ideal material has not already found to be injected around ureter opening (Berger *et al*., 2008; Golfurushan *et al*., 2011; Goldust *et al*., 2011). Lich-Gregior is one of the considerable methods in this regard. Comparing with other methods, advantages of this anti-reflux surgical technique are as follows: (1) It can be successfully used in thick ureters and high grade reflux, (2) The anti-reflux operation can be done one-laterally without negatively affecting the opposite ureter (health ureter), (3) The bladder is not opened during surgery and ureter and bladder drainage is not required and (4) There is a short-term hospitalization period and the patient is released without tract catheter (Goldust *et al*., 2011; Riedmiller and Gerharz, 2008; Sadeghpour *et al*., 2011). The present study evaluates efficiency and effects of Lich-Gregoir technique in treating vesicoureteral reflux.

MATERIALS AND METHODS

Subjects: In this cross sectional-analytical study, 32 patients (younger than 15 years old) were selected with 47 reflux units. The patients underwent anti-reflux surgery using Lich-Gregoir technique with diagnosis of one-lateral or bilateral vesicoureteral reflux from April 2009 to April 2012 at Imam Reza and Amiralmomenin hospitals of Tabriz. The patients were simply randomly selected. After description of the research and its objectives, written consent was obtained from all patients to participate the study. All patients were informed that participation on the study is completely voluntarily and they can leave the study when they want. This study was approved by ethic committee of Tabriz University of Medical Sciences.

Inclusion and exclusion criteria: The inclusion criteria were younger-than-15-years children with vesicoureteral reflux, recurrence urinary infection despite of medical treatment and consumption of antibiotics, increasing renal scar rate despite of medical treatment, suffering from acute pyelonephritis despite of medical treatment and consumption of antibiotics and those adolescent girls suffering from reflux but their reflux has not treated until their marriage. Children with neurogenic bladder and children with bladder output obstruction were excluded from the study.

Methodology: During first month after surgery, the patients were evaluated considering premature postoperative complications. Six weeks after Lich-Gregoir surgery, hydronephrosis severity of the involved kidney was evaluated in terms of possibility of stenosis in the understudy patients using sonography. Six months after surgery, VCUG technique was used to evaluate recurrence of vesicoureteral reflux in these patients.

Statistical analysis: All understudy data was analyzed using SPSS 16 statistical software. Descriptive statistical methods (frequency, percentage, mean and standard deviation) were used to evaluate the data statistically. In this study, chi-square test was used to compare qualitative variables and $p<0.05$ was regarded meaningful.

RESULTS

In this study, 32 patients with 47 units of reflux were evaluated. Mean age of the patients was 5.85±3.81 years such that the youngest and oldest patients were 7 months and 15 years old, respectively. Most of the patients were female (71.88%) recurrence urinary infection was the main cause (56.25%) of their referring to physician. There were one-lateral and bilateral reflux in 17 (53.1%) and 15 (46.9%) of cases. It was one-lateral in 6 (66.7%) of male and 11 (47.8%) of female patients. Bilateral reflux was observed in 3 (33.3%) of males and 12 (52.2%) of females. As seen, bilateral cases in females are more than males. However, Fischer's exact test did not refer to any meaningful difference in this regard ($p = 0.44$). Often, the involved kidneys are of grades V and VI reflux (Fig. 1). The reflux was seen in the right and left sides in 23 (48.9%) and 24 (51.1%) of cases. Before surgery, kidney hydronephrosis was reported in 32 (68.1%) kidneys. The other 15 kidneys did not experience hydronephrosis. Preoperative VCUG results indicated to disorder in all cases. The follow-up period after surgery demonstrated normal VCUG in most cases (95.7%) six months after surgery. Also, two abnormal cases of VCUG were observed during the 6th month became normal within 8 months after surgery through repeating VCUG (Fig. 2). Surgery was successful in 45 (95.7%) cases within first 6 months of follow-up period. The other successful cases were associated with smoothing the severity and grade of reflux. Both cases were seen in the right kidney and with grade I reflux. Sonographic studies conducted 6 weeks after surgery to evaluate possible complications the surgery (ureteral stenosis) in comparison with preoperative conditions did not indicate to any hydronephrosis and demonstrated decrease of hydronephrosis in all cases. The reflux was recurred only

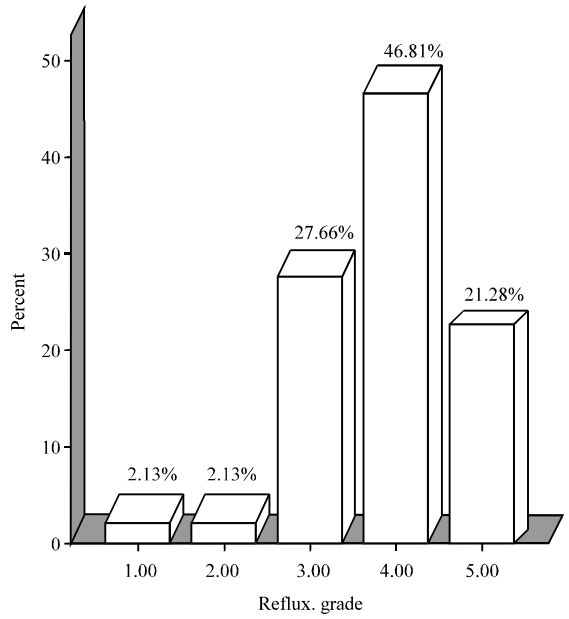

Fig. 1: Grade of reflux in the involved kidney Reflux grade (I, II, III, IV, V), Percent (%)

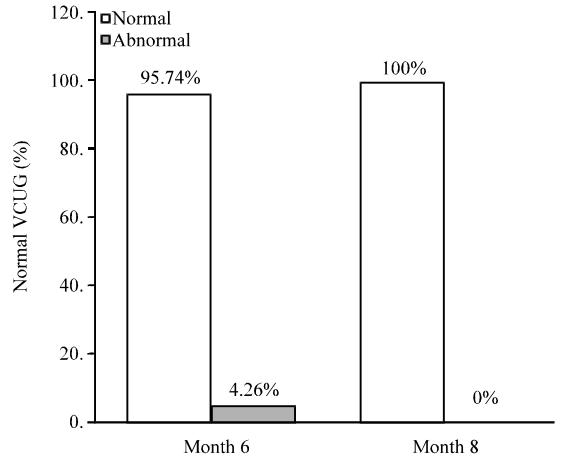

Fig. 2: Voiding cystourethrogram outcome after surgery

in 2 (4.3%) cases within 6 months after surgery which detected through controlling the patients at the end of an 8-month follow-up period. The complications were observed in 2 (6.25%) patients (out of 32 ones) including urinary retention in a patient with bilateral reflux. The complication recovered two days after surgery. In another patient with bilateral reflux, lymphocele was seen in pelvis and discharged.

DISCUSSION

Vesicoureteral reflux is a main problem during childhood affecting about 1% of all children and 25-40% of those referring with acute pyelonephritis. Mild cases of VUR are automatically recovered but there is a compound of VUR, recurrence pyelonephritis and renal scar in most acute cases leading to renal dysfunction. There are not any guidelines to optimally treat VUR (Barrero *et al*., 2007; Candau *et al*., 2008). There are different treatment methods to treat vesicoureteral reflux including medical and surgical techniques. More than 50% of children primary reflux can be controlled through non-surgical methods but other cases of reflux require surgical interventions (Barrero *et al*., 2007). There are different surgical methods to treat VUR. Lich-Gregoir is one of these techniques attracted more attention. Urinary infection especially among females is the most common outcome of reflux. Urine may be sterile in males due to their long urinary tract (Gurkan *et al*., 2006). In the present study, repeated and recurrence urinary infection is the main reason (56.3%) for referring children to the physician. It has been stated that automatic recovery rate is about 80% for grades I and II VUR. However, automatic recovery rate of high grade reflux is rare (52%) during 10 years of prevention from urinary system infection. Therefore, surgical treatment is recommended in most cases which do not respond to treatment with any grade of VUR. In the present study, grades I-V reflux was seen in 1,1,13,22 and 10 persons, respectively. In the study conducted by Riquelme *et al*. (2006) grades I-V VUR was observed in 2,9,16,16,2 children required surgical treatment (Riquelme *et al*., 2006). In comparison with the above-mentioned study, there are more cases with high rate of severity in the present study. Additionally, there was kidneys hydronephrosis in 68.1% of cases suffering from vesicoureteral reflux in the present study. Out of 45 subjects of the study conducted by Berger *et al*. (2008) hydronephrosis was observed in 18 (40%) cases. It was less than the rate observed in the present study. Surgical treatment was regarded as treatment gold standard for high grade VUR and its success rate is more than 95% (Schwentner *et al*., 2006). The highest rate of success (97.8%) was reported by Vuckov *et al*. (1999). In the present study, success rate of surgery was 95.7 and 100% during first 6 months and 8 months after surgery, respectively. Total rate of success in the present study is higher than other ones. Although, surgery is regarded as gold standard of VUR treatment, it is not free of complications such that obstruction is seen in 0.3-9.1% of cases and grade V VUR remain in about 20% of cases after treatment (Baldwin *et al*., 2005). In the present study, there was not any case of postoperative obstruction during follow-up periods. Urinary retention and lymphocele were of complications (6.25%) observed

in the present study. Both cases occurred in patients with bilateral reflux. Urinary retention was automatically recovered and lymphocele was discharged. Vomit, nausea, pain and hematuria were rarely observed (Barrero *et al*., 2007). The study conducted by Zupancic *et al.* (2004) indicated to urinary retention in 3 patients with bilateral VUR (Zupancic *et al*., 2004). Contrary to the above-mentioned study, urinary retention or other complications were not observed in bilateral reflux during one year follow-up period in the study conducted by Berger *et al.* (2008). In their study, mild hydronephrosis was observed in 6 patients within one year after surgery (Berger *et al*., 2008). Contrary to the above study, increase of postoperative hydronephrosis was not seen in nay subject rather its severity was decreased in comparison with preoperative conditions.

CONCLUSION

Lich-Gregoir surgical technique was introduced as an appropriate treatment method to treat vesicoureteral reflux in children due to its high rate of success, less complications and recovery of hydronephrosis.

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