

A Prospective Study to Assess the Functional Outcome of Pyeloplasty

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Abstract

We studied 44 consecutive patients with UPJ obstruction at our institute to assess their functional outcome of pyeloplasty by analysing their GFR and drainage pattern in preoperative and postoperative renal scan. The postoperative renal function was found to remain static in substantial proportion of the patients (72%) with only 6% showing a post-operative improvement in renal function. Drainage improved in 76% of the patients on post-operative diuretic scintigraphy as evaluated using various parameters. However a majority (88%) of the patients experienced an improvement in symptoms and relief of pain which appears to be the most crucial outcome rather than the improvement in renal function. There was no correlation found between age, preoperative serum creatinine, degree of hydronephrosis i.e. parenchymal thickness, preoperative GFR and postoperative functional improvement.

Purpose

To analyse the functional outcome of pyeloplasty in patients with UPJ obstruction in terms of improvement in split renal function and pattern of drainage at our institute.

To evaluate various preoperative factors predicting outcome in postpyeloplasty patients.

Material and Methods

In an open, prospective and observational study, 44 consecutive patients, with UPJ obstruction, underwent dismembered pyeloplasty, between Jan 2010 and Dec 2012, were analysed to determine their functional outcome.² DJ removal was done at 6 weeks and postoperative 6 monthly DTPA scans were done. Pre and postoperative scans done in the same centre and operator were

compared. Standard F+0 protocol was followed.¹ Dose of furosemide used was 40 mg for adults and 0.5 mg/kg for children.² Intra-op renal biopsy was not taken. Factors affecting outcomes of pyeloplasty were assessed with regard to age, serum creatinine, preoperative renal anatomy and parenchymal thickness i.e. grade of hydronephrosis, preoperative renal function (GFR < or >20 ml/min).

Results

61% patients were male in the age group of 1 yrs to 68 yrs with mean age of 28.5 yrs. Pain was the commonest symptom (97%) and congenital UPJ obstruction the most common aetiology followed by iatrogenic. 25 out of 49 patients were followed up as per protocol. Improvement in renal function was defined as increase in GFR by more than 10% and any value below 10% were

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disregarded to allow for statistical errors of renal scan. GFR remained unchanged in majority 18 (72%) of patients, improved in 4 (16%) and decreased in 3 (12%) patients. Four patients with improved postoperative GFR had their preoperative GFR in the range of 12 to 45 ml/min, with mean improvement in postoperative GFR of 10 ml/min. On the same note, 72% patients with postoperative unchanged GFR, had preoperative GFR in the range of 11 to 58 ml/min. Drainage was improved in 19 (76%) of the 25 patients, remained obstructed in four patients (16%) while it was non-assessable in two, due to grossly reduced renal function. No correlation was found between age, preoperative serum creatinine, degree of hydronephrosis i.e. parenchymal thickness, preoperative GFR and postoperative functional improvement.

Discussion

The indications of surgical intervention on DTPA renal scan were 'peak to ½ peak' time of > 20 mins, type II or type IIIb excretory curve on renogram (especially after diuretic administration).^{13,14} Diagnosis of obstructed drainage was made considering all the criteria's together and not just on a single parameter, often using USG, IVP, RGP and diuretic renal scan together whenever need be.

Around 72% patients revealed an unchanged renal function and 76% of patients showed a non-obstructed drainage postoperatively, in our study. Almost 84% patients became symptom-free and only three required a redo surgery. Clark and Malek found 95%

success in resolution of clinical symptoms and 91% success in decompression of pelvicalyceal system on urography after one surgical repair.³ O'Reilly in his study of 26 consecutive open Anderson-Hynes dismembered pyeloplasty found that almost every case showed an improved function postoperatively.⁴ In his another article 'The long-term results of Anderson-Hynes pyeloplasty' in 2001, O'Reilly reported that functional improvement occurred in 79% of their patients and 96% showed in improved drainage.⁹ Similarly, Sheu et al reported that improvement in renal function occurred in almost 62% of the cases in their series, while the function remained static in only 27.5% of the cases.¹⁰ He observed that the functional improvement can be expected in the majority of the kidneys having impaired function at presentation. Conversely, in our series majority had an unchanged function postoperatively, however a significant number experienced an improvement in drainage and became symptom-free. The same outcome was shared by McAleer et al, who reported that the improvement in renal function is seldom found regardless of the initial function of the index kidney.¹²

Osama et al, in a retrospective analysis of 526 cases of open pyeloplasty with huge renal pelvis found that obstruction persisted on diuretic renography in most cases (65%), but improvement in hydronephrosis occurred in all patients. They defined success as both symptomatic relief and radiographic resolution of obstruction.⁸

It has been shown that a long standing

obstruction inflicts permanent and irreversible changes in the nephrons, through hydrostatic-pressure-induced injury to the tubular epithelium, especially collecting ducts. They can also undergo epithelial-mesenchymal transdifferentiation, migrate from the epithelium, and contribute to the pool of interstitial myofibroblasts that can eventually lead into tubulointerstitial fibrosis (TIF).⁵ The tubular injury leads to tubulointerstitial inflammation, tubular atrophy, and fibrosis, eventually producing an irreversible damage unless the process is reversed.⁶ Histological sections of the kidney early after obstruction show dilation of the tubules, confirming the importance of the urinary pooling effect. The transferred pressure causes the epithelial cells lining the nephron to have a flattened appearance. The cessation of this primary insult relies on increased compliance in the ureteropelvic region and the shunting of pooled urine to local lymphatics. Later in the course of obstruction, the renal blood flow (RBF) markedly decreases, preventing further increases in the volume of pooled urine by eliciting a reduction in the GFR.⁷ Congenital UPJ obstruction associated with significant obstructive element diagnosed at a later age (in adults), thus, has usually sustained an irreversible injury that prevents the recovery of lost function even when the obstruction is relieved.

Patients with poor renal function (GFR less than 20 ml/min) were often found to be reluctant for nephrectomy. They were counselled by us for future nephrectomy

(i.e. second surgery) if they remain symptomatic. As already mentioned, all the three patients with postoperative deterioration in renal function had poor split renal function preoperatively (GFR < 20 ml/min). Two of these three patients also had persistent symptoms postoperatively. Ortapamuk et al shared a similar experience. They reported that renal function improves after pyeloplasty with regard to the initial level of split renal function in adult obstructed kidneys. They concluded that improvement may not be observed in patients with preoperative differential renal function less than 30%.¹¹ Thus, this sub-group needs an additional counselling pertaining to the postoperative lack of improvement in their renal function or resolution of their symptoms.

Conclusion

Split renal function usually does not improve after pyeloplasty and remains unchanged in substantial proportion of the cases. Patients with borderline functioning kidneys should be counselled for post-operative lack of improvement in their renal function and symptoms. They should be informed regarding possibility of requiring a second surgery afterwards. There was no correlation between age, preoperative serum creatinine, degree of hydronephrosis i.e. parenchymal thickness, preoperative GFR and postoperative functional improvement.

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Is widespread screening for hepatitis C justified?

In 2012, the advent of new treatments for hepatitis C led the US Centers for Disease Control and Prevention (CDC) to recommend screening of everyone born during 1945-65 since it estimates that three quarters of all people infected are in that age cohort.

If the treatment of hepatitis C is to be scaled up regulatory agencies should ensure that drugs have been evaluated by long term follow-up of clinical outcomes (not just surrogate markers)

The financial cost of treatments have been discussed elsewhere, but given the uncertainty about the validity of the surrogate markers, the lack of evidence regarding clinical outcomes of treatment or of screening strategies, and the adverse events caused by the newer regimens, screening may be premature.

Until then, physicians should not be pressured to enforce birth cohort screening strategies out of enthusiasm for new treatments that have not yet been shown to cause long term clinical improvement.

The CDC and other major organisations are recommending birth cohort population screening for hepatitis C infection

Only a minority of patients with chronic hepatitis C infection will ever develop end stage liver disease

We cannot reliably identify those who will develop end stage liver disease

Drug trials rely on surrogate markers such as sustained virological response, which is not a cure

Physicians should resist screening until we have strong evidence that antiviral therapy is clinically effective and the benefits outweigh the harms

Ronald L Koretz, Kenneth W Lin, John P A Ioannidis, Jeanne Lenzer, *BMJ*, 2015, Vol 350, 15-17