

Case Report

Reflex Anuria Following Laparoscopic Hysterectomy

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Keywords

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- Hysterectomy
- Renal impairment
- Post-operative

Abstract

Introduction: Postoperative anuria strikes fear into the heart of gynaecologists; ureteric trauma or occlusion must be considered. If excluded non-mechanical causes must be sought. 'Reflex anuria' has been proposed as a rare cause.

We present a case of anuria following laparoscopic hysterectomy and bilateral salpingo-oophorectomy (TLH + BSO) with a review of the literature regarding 'reflex anuria'.

The Case: A fit 85 year old lady underwent a TLH + BSO for endometrial cancer. She had a congenital single kidney with normal renal function.

The procedure was completed satisfactorily; however in the immediate postoperative period she became anuric despite fluids and frusemide. Her serum creatinine increased from 78 to 187µmol/L over 12 hours. A nephrostomy was inserted for presumed ureteric obstruction, good urine output ensued and renal function improved. When a ureteric stent was passed the ureter was found to be patent.

Discussion: Prompt management of anuria is essential to prevent permanent renal impairment. Post-hysterectomy, ureteric trauma must be investigated. Reflex anuria; no urine output in response to irritation of a kidney or ureter in the absence of mechanical obstruction, may be due to vascular or neurogenic stimuli, causing ureteric spasm. Some degree of ureteric spasm may occur in many patients undergoing pelvic surgery but with a single kidney, the effect was more profound in this case.

Conclusion: We present an unusual case of anuria due to non-mechanical obstruction. The key to ensuring a good outcome is prompt investigation and management.

ABBREVIATIONS

TLH + BSO: Total Laparoscopic Hysterectomy and Bilateral Salpingo-Oophorectomy

INTRODUCTION

Early post-operative anuria following pelvic surgery should prompt urgent investigations including those aimed at identifying any intra operative ureteric trauma or obstruction. If, together with major haemorrhage, these are excluded other causes must be sought. The concept of 'reflex anuria' has been proposed as a rare cause of anuria in the absence of mechanical obstruction. It is defined as the cessation of urine output from both kidneys in response to irritation or external trauma to one kidney or its ureter, in the absence of mechanical obstruction, or due to severely painful stimuli to other organs [1].

We present a case of post-operative anuria without mechanical obstruction following laparoscopic hysterectomy and bilateral salpingo-oophorectomy (TLH +BSO) with a review the literature regarding 'reflex anuria'.

CASE PRESENTATION

A fit 85 year old woman underwent a TLH + BSO and peritoneal washings for a grade 3 endometrioid endometrial cancer. She was known to have a congenitally absent right kidney and had normal renal function at her pre-operative assessment. In her thirty's she had undergone a midline laparotomy and possible myomectomy for a presumed large fibroid. Palmers point entry was used in view of the previous midline incision; however there were minimal adhesions within the abdomen and pelvis. It appeared on closer inspection of the uterus that the 'fibroid' removed in the past may have actually been the right horn of a bicornuate uterus with the right tube and ovary adherent to the abdominal wall above the pelvic brim. The operation was undertaken without intra operative complications; the left ureter was identified prior to ligating the left tubo-ovarian pedicle and cleared as is the usual practice of the surgeon. Pneumoperitoneum was maintained at a pressure of 12 - 15mmHg and there were no periods of intra operative hypotension. In recovery the patient was noted to be anuric despite fluid boluses and 20mg frusemide administered by the anaesthetist. The patient was transferred to the critical care department for close observation overnight and over the next

12 – 18 hours her creatinine increased from 78 to 187µmol/L. An ultrasound of the renal tract the following morning indicated possible mild hydronephrosis but no hydroureter or collection suggestive of aurinoma, and therefore a nephrostomy was performed for presumed ureteric obstruction. A good urine output ensued and renal function returned to normal. When a retrograde stent was passed along the ureter however, it was found to be patent with no evidence of mechanical obstruction or constriction. The patient went on to make a good recovery and was discharged on the fourth postoperative day. The nephrostomy was removed six weeks after insertion and at six month follow up the patient remains well.

DISCUSSION

Obstruction of one ureter in a patient with two normally functioning kidneys usually has little impact on urine output or renal function [2]. Complete cessation of urine output (anuria) is very rare and following pelvic surgery, ureteric trauma (transection or obstruction) must be suspected and thoroughly investigated. Prompt management is essential to prevent permanent renal impairment. If these causes are excluded alternative diagnoses must be considered [3]. Underlying causes of anuria and acute renal failure are categorised as pre-renal, renal and post-renal and include obstructive or vascular causes or severe acute glomerulonephritis [4]. The concept of reflex anuria was first described in 1940 by Hipsley who observed it in military casualties in the United States [5]. Only a small number of cases have ever been described in the literature most commonly due to unilateral ureteric obstruction including due to an impacted ureteric calculus [1,6,7]. Gholyaf and colleagues have reported the only case following hysterectomy that resolved five days post-procedure [2]. Other causes have been described after renal tumourembolisation [8], after partial hepatectomy in a child [9] and following ureteric catheterization [10]. In all cases patients had two kidneys.

The pathophysiology of reflex anuria is unclear, however, two possible hypothesis have been proposed [3]; a stimulus to one kidney leading to a 'reflex spasm' of the intra renal arterioles of both kidneys causing the complete cessation of glomerular filtration; reflex spasm of both ureters following a stimulus to one ureter or kidney (such as a renal calculus or arising from a vascular insult) leading to bilateral hydronephrosis and an empty bladder. The possible mechanisms for this 'reflex spasm' have been demonstrated in animal studies and include vascular or neurogenic stimuli. [3] Some authors suggest reflex anuria may occur in many more patients however; the effect is so short lasting in the majority normal diuresis resumes before it is recognized [3,11]. It may be some degree of ureteric spasm occurs in many patients who have pelvic surgery, especially those undergoing extensive pelvic side wall dissections, causing varying degrees of oliguria and reflex anuria may be the extreme end of the spectrum. In an elderly patient with a single kidney, the effect may have been more clinically apparent.

Management is based on treating the developing acute renal failure to prevent long-term renal impairment. The small number case reports suggest a variety of strategies have been used. Observation only may be appropriate if there is minimal change in renal function and urine output improves within hours [3]

oureteric stenting; however in the absence of ureteric dilatation or hydronephrosis stenting had no impact on the resolution of the anuria and has been shown to exacerbate or even cause the spasm in some cases [10]. Nephrostomy has also been used either because an obstructive cause for the anuria was suspected, as in this case, or if the anuria is thought to be due to a spasm of the ureters and renal function is deteriorating, however it may have no effect if it is the intra renal arterioles that have undergone reflex spasm. In cases of acute renal failure; blood pressure control, correction of fluid and electrolytes and haemodialysis are required [3]. In our case mechanical obstruction was suspected after the ultrasound scan, leading to insertion of a nephrostomy. It could be argued the cause of the obstruction was intra or extra-ureteric oedema due to the surgery, although this was not demonstrated on the ultrasound and CT was not performed due to her deteriorating renal function which resolved after insertion of the nephrostomy. Several authors have reported cases of intra-ureteric oedema causing post-operative anuria in the context of prophylactic ureteric stenting in colorectal surgery [12-14].

Other potential factors that can influence renal function in patients undergoing laparoscopic surgery include intra operative hypotension and a pneumoperitoneum of greater than 15mmHg. Both have been shown to lead to a reduction in renal blood flow and significant oliguria especially in patients with a single kidney [15]. Positioning of a patient during surgery can also have an impact on renal blood flow with reverse Trendelenberg (the head is elevated higher 15 to 30 degrees in the air) associated with reduced renal blood flow [15]. In this case blood pressure was maintained at or above 100/60mmHg throughout the procedure, the patient was positioned in a head down tilt of approximately 15 degrees (Trendelenberg), there was no major haemorrhage and intra-abdominal pressure did not exceed 15mmHg. In summary we present an unusual case of post-operative anuria due to non-mechanical ureteric obstruction. Factors including alterations in renal blood flow, intra-abdominal pressure and the concept of 'reflex anuria' should be considered in such cases. The key to ensuring a good outcome for any patient with anuria is prompt investigation and management to prevent permanent renal impairment.

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