Focus on Details

Modified technique of renal defect closure following laparoscopic partial nephrectomy

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INTRODUCTION

Laparoscopic partial nephrectomy is now accepted as the ideal treatment option for favourably located tumours of <4 cm [1,2]. The most obvious group of patients who benefit from this procedure are individuals in whom a normal contralateral kidney is under future potential threat, e.g. from hypertension, diabetes and hereditary cancer such as the Von Hippel–Lindau syndrome. Long-term data has shown oncological efficacy similar to that of traditional open radical nephrectomy [3].

The major impediment has remained the difficulty of haemostasis. To ensure a bloodless field, it is necessary to control vascular supply to the renal parenchyma by clamping the renal artery and vein *en bloc* before tumour resection. This provides a 'window' of warm ischaemia time during which the surgeon can complete the procedure and revascularize the kidney to prevent ischaemia-induced renal injury. A short duration of warm ischaemia (≤30 min) is well tolerated and further clinical data suggests that ischaemia times approaching 60 min are safe in most instances [4]. Haemostatic control and defect closure in the laparoscopic setting can be challenging. We describe a technique that significantly reduces operative and warm ischaemia time whilst ensuring a haemostatic and watertight closure.

METHODS

We have modified the technique described by the Cleveland group for laparoscopic partial nephrectomy [5]. After a transperitoneal approach and standard renal dissection, the renal vein and artery are identified. Full pedicle dissection is unnecessary and is completed to the extent whereby *en bloc* clamping can be safely performed. The renal pedicle is clamped with a laparoscopic Satinsky clamp through a 12-mm port. The tumour together with covering perinephric fat is located. The renal capsule is delineated with 'L' hook electrocautery to outline the resection margins. Dissecting scissors are used for the parenchymal incision and tumour excision. The depth and margins of the excision are governed by preoperative radiological evaluation, surgical experience and specimen inspection. Haemostasis and renal defect closure is achieved with a horizontal mattress suture that does not require knot tying as follows.

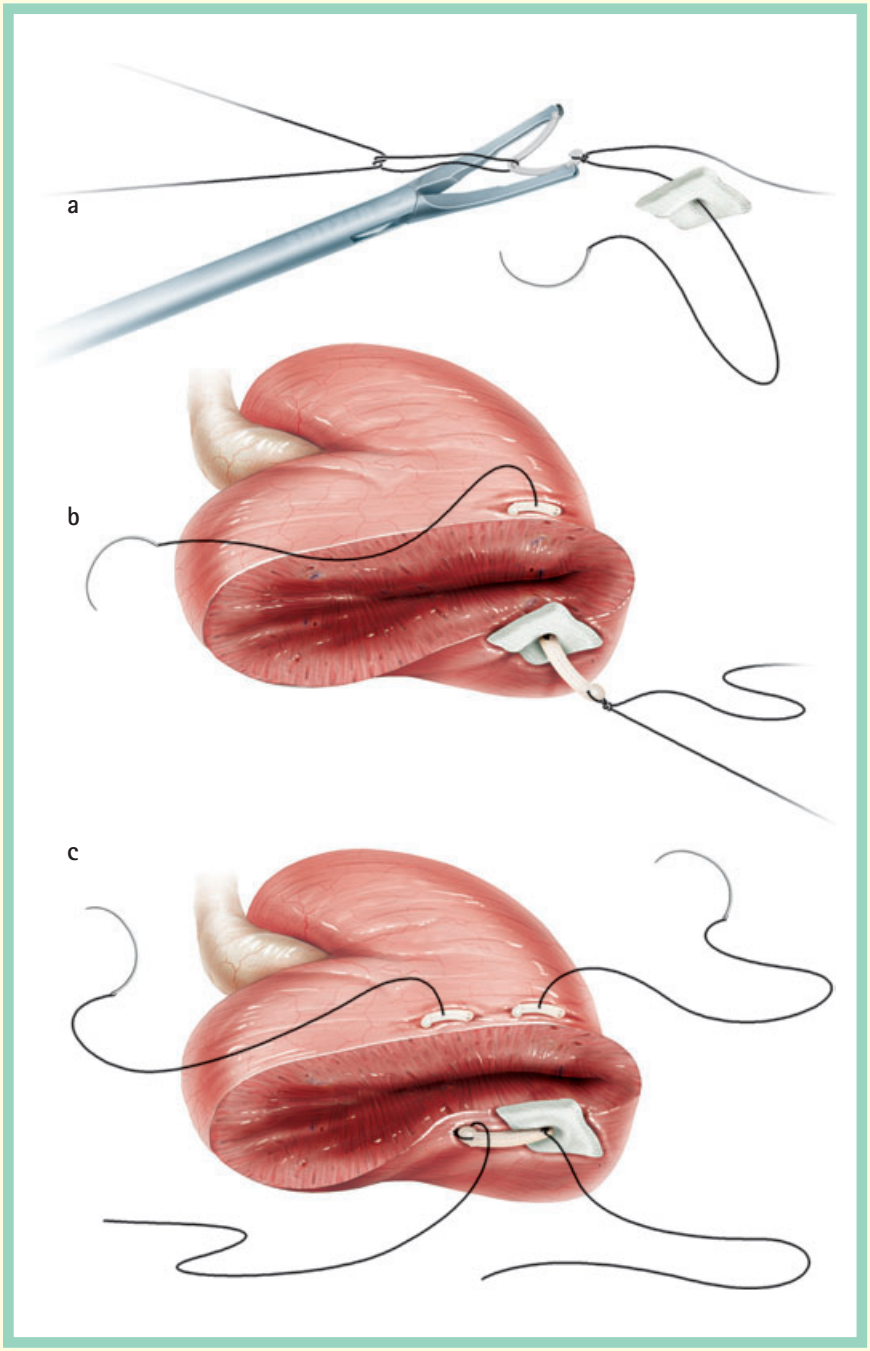


Figure 1

(a) Depending on the perceived defect size, 2–3 combined sutures are prepared preoperatively consisting of two Circle Taper 40 mm taper needles, 0 polyglactin 910 (Vicryl™. The two sutures are cut to 22 cm and both sutures are tied to an extra large size Hem-o-lok haemostatic clip (Teleflex Medical, Research Triangle Park, NC, USA) 7 cm from each of the free suture ends. A small Dacron felt is passed through one suture needle.

(b) The suture segment with the Dacron felt is placed across the renal defect 1 cm from the resection margin and secured in position with a medium size Hem-o-lok clip as it exits the parenchyma, again 1 cm from the resection margin. This suture is secured by placement into the mid-portion of the Hem-o-lok clip, which allows tension adjustment (sliding) but does not definitively lock the suture in position. Dacron felt on the opposite side of the wound helps prevent penetration of the renal parenchyma by the Hem-o-lok while pulling the suture.

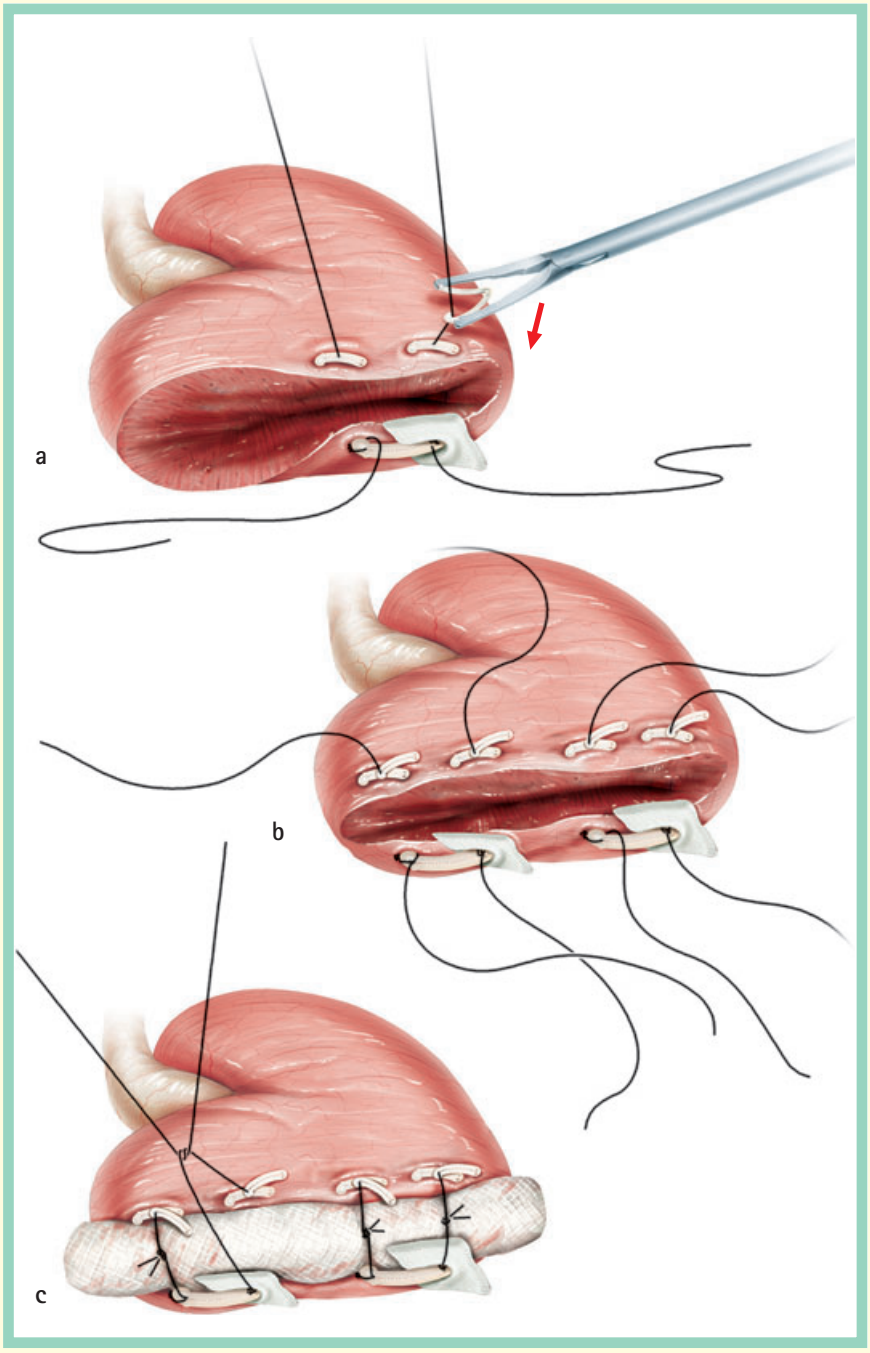
(c) The other segment of suture is then placed corresponding to this in a mattress position. A Hem-o-lok clip again secures it into position.

Figure 2

(a) Now a second Hem-o-lock clip is applied with its locking end over the first one after further sliding the first initial clip firmly against the renal parenchyma to achieve haemostatic closure. This is done to both suture segments. Hem-o-lock clips applied in this way virtually lock the suture and thus eliminate the need of knot tying.

(b) This procedure is repeated throughout the length of the defect. The hilar clamp is removed once all sutures are placed and secured.

(c) Once the needles are removed, the free suture ends are tied over a suitably fashioned bolster of Surgicel (Johnson and Johnson, New Brunswick, NJ, USA) thus securing it to the defect.



Suture tension through the parenchyma can be adjusted when the second Hem-o-lok clip is being applied thus allowing for subsequent renal swelling at reperfusion. This adaptation allows for uniform tension throughout the mattress configuration and prevents the 'cheese wiring' effect and tearing of parenchyma seen in high-tension suture placement.

This technique is a variation of that described by Singh *et al.* [5]. The authors feel that this technique lessens the defect closure time and subsequent warm ischaemia time. The use of the mattress configuration and pre-prepared sutures enables parenchymal closure at precisely spaced intervals, with suture placement exactly separated by the length of the Hem-o-lok clip. This technique achieves complete haemostasis once the hilar clamp is removed. The surgical bolster was used for added security but was not instrumental for haemostatic closure.

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