



## Case report

# Bilateral nephrectomy as a rescue therapy for refractory hypertension in an end stage renal disease patient: <sup>1</sup>Brahmastra in hypertension management—A case report

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## ABSTRACT

Refractory hypertension is a challenge in End Stage Renal Disease (ESRD) patients who are on regular hemodialysis, despite the use of novel antihypertensive agents and tailor-made dialysis prescriptions. Bilateral nephrectomy seems to be a forgotten option. We present a case history of 16 year old boy who underwent open bilateral nephrectomy as a rescue therapy for refractory hypertension. This surgical treatment option of blood pressure led to satisfactory control of hitherto refractory hypertension complicated with multiple life-threatening episodes of hypertensive crises.

## 1. Introduction

Uncontrolled hypertension is commonly seen in patients with end-stage renal disease [1]. Mainly two strategies are practiced to control hypertension; first, pharmacological approach is considered to be the cornerstone with the use of multiple classes of antihypertensive drugs, and the other is of ultra-filtration titration in hemodialysis with resultant reduction of plasma volume and optimization of dry weight [2]. Bilateral nephrectomy is practiced infrequently as a treatment option for refractory hypertension where blood pressure control remains refractory to traditional approaches [2]. Availability of new classes of antihypertensive drugs along with long-acting formulas and advancement in dialysis therapy has made bilateral nephrectomy a redundant practice. [3]. Here, we present of the usefulness of bilateral nephrectomy as rescue therapy for refractory hypertension in a young boy with ESRF. The case report has been made in line with the SCARE 2020 criteria [4].

## 2. Case presentation

A 16 year young patient with ESRF was evaluated for multiple episodes of life-threatening hypertensive emergency crises, the patient was diagnosed with systemic hypertension at the age of 13, where he

presented late with ESRF and later initiated on hemodialysis, and his blood pressure largely remained refractory to pharmacological and volume reduction measures since initiation of hemodialysis. He was diagnosed with posterior urethral valve during his infantile period and underwent cystoscopic posterior urethral valve ablation at the age of 1½ years. It failed and vesicostomy was planned. Unfortunately, patient had defaulted follow-up and presented again at the age of 10 years with advanced chronic kidney disease due to obstructive uropathy. He was euvolemic on examination even at times of hypertensive crises and there were no abdominal mass palpable or renal bruit audible on auscultation. Also, there was no blood pressure (BP) difference between arms. There was no family history or genetic predisposition identified of renal disease or hypertension. He was an active person with pleasant demeanor and did not have any alcohol or substance addiction. He was not a smoker either.

On further evaluation, transthoracic echocardiography showed ventricular hypertrophy with satisfactory ejection fraction, NCCT/KUB excluded ureteric obstruction (Fig. 1a) and renal angiogram was performed and renal artery stenosis was excluded and there were no evidence of suspicious lesions in the adrenal glands to suggest a secondary cause for refractory hypertension (Fig. 1b). Renin-Angiotensin-Aldosterone-System (RAAS) was not evaluated due limited availability

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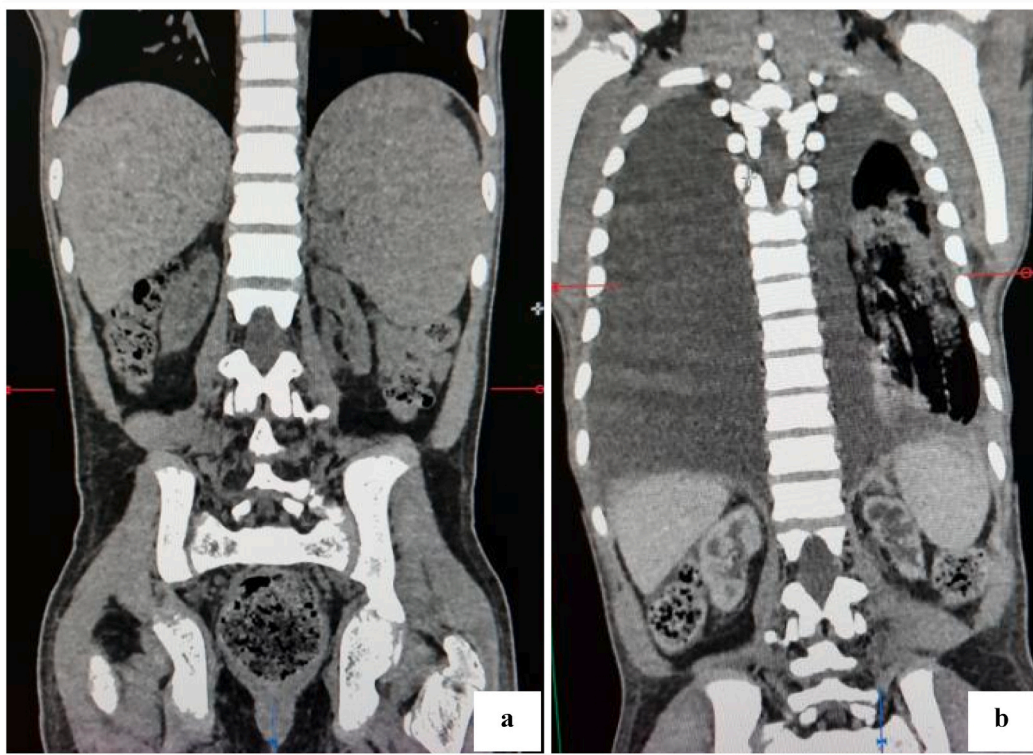
<sup>1</sup> In Hindu mythology, Brahmastra is considered to be the most powerful weapon.

and the difficulty in omitting the hypertensive medications interfering with the assessments. Since the age of 14 he had had recurrent hospital admissions due to hypertensive emergency and urgency crises. Every time he was managed acutely in intensive care settings with multiple antihypertensive agents. Secondary treatable causes were extensively evaluated and excluded. As a long-term management, he was prescribed with various classes of anti-hypertensive which included losartan 50 mg BD, carvedilol 25 mg BD, prazosin (sustained release) 5 mg BD, spironolactone 100 mg MANE, nifedipine 20 mg BD, hydralazine 25 mg TDS and labetalol 100 mg BD and various combination of the above spread through different time intervals. Even with above measures and expertise advice from hypertensive specialist his blood pressure remained uncontrolled and he continued to develop frequent episodes of hypertensive emergency crises. A multi-disciplinary team comprising of physicians, nephrologists, urologists, endocrinologist, anesthetists, vascular surgeon and transplant surgeon concluded the cause of refractory hypertension was likely to be of reno-vascular and sympathetic hyperactivity in origin. A shared decision was made following extensive discussions with the patient and his family and valuing their desperate request to find a lasting solution and to avoid further occurrence of life threatening crisis. As a management option and life saving measure, it was decided to proceed with bilateral nephrectomy while waiting for renal transplantation. It was also expected the surgical option would improve the quality of life and reduce the number of life threatening hypertensive emergency crises. The patient was admitted to intensive care unit (ICU) prior to the surgery for optimization and control of blood pressure by the anesthetic team. The routine antihypertensive medications were titrated and hemodialysis prescribed the day before the surgery to optimize the pre-operative blood pressure. The surgical procedure of bilateral nephrectomy (Fig. 2) was carried out without any complications and the post-operative periods were uneventful as well.

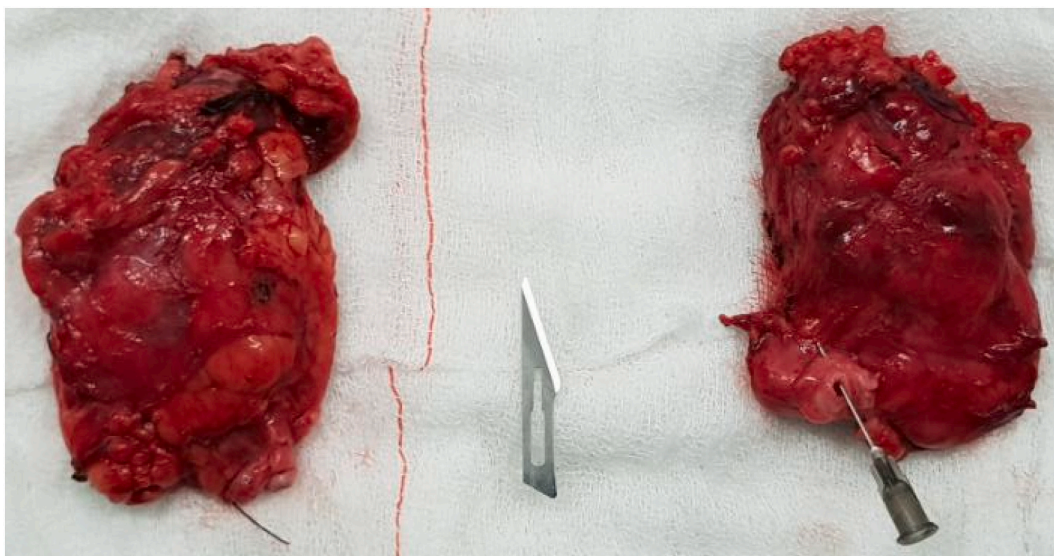
Patient tolerated it well without any complications and upbeat during the ICU stay. The surgery adhered strictly with surgical protocol and safety check list. Bilateral nephrectomy was carried out by three senior urological surgeons, who were in trainer positions with vast experiences in nephrectomy including open/endo surgeries. In our patient, a trans-peritoneal open approach via midline incision for bilateral nephrectomy was adopted. On the follow up, patients and his family was pleased with the outcomes of the surgery and eventually the blood pressure control. In the 4th week of post-operative period, he became normotensive and did not need any antihypertensive medications. He was enlisted for cadaver renal transplant list and put on regular hemodialysis on four times a week dialysis regime.

### 3. Discussion

Hypertension is commonly found in end stage renal disease patients. Sodium and water retention, activation of RAAS pathway and increased sympathetic activity play a role in pathogenesis of hypertension in end stage renal disease patients. Though hypertension is under control in majority of patients with end stage renal disease, nearly 20 % remain with uncontrolled or resistant hypertension despite the use of pharmacological and volume reduction options [5]. Bilateral nephrectomy has been in practice as a treatment option for malignant hypertension since 1930 [6]. Advent of new classes of antihypertensive drugs, mainly the drugs acting on RAAS and with the advances in dialysis techniques, use of bilateral nephrectomy has declined over the years. Now it is practiced infrequently for refractory hypertension. The prevalence of bilateral nephrectomy as a treatment option ranges from 0 to 7 % in various countries [7]. Bilateral nephrectomy leads to reduction in the levels of renin, angiotensin and aldosterone, which subsequently lowers the blood pressure. It also reduces blood pressure as it decreases the



**Fig. 1.** (a): NCCT/KUB shows bilateral contracted kidney with no stones or obstruction. (b) Contrast CT of kidney and renal angiogram shows contracted kidney with no hydronephrosis and no renal artery stenosis.



**Fig. 2.** Bilateral nephrectomy specimen, compare with size of number -11 blade. A needle is inserted inside the dilated thickened left ureter due to childhood obstructive uropathy with posterior urethral valve.

sympathetic activity [8]. A study done in Lucknow, with 15 patients showed that there is significant reduction in mean arterial pressure in the post-operative period and it was normalized at 2 weeks of post-operative period [9]. In another study done in Poland with 10 patients, showed 9 out of 10 patients had normal systolic and diastolic blood pressure values during the third month of post-operative period [10]. The clinical state and quality of life improved in all patients post operatively [9]. We observed the same in our patient. Blood pressure reduced since the first post-operative day and subsequently normalized in the 4th week of post-operative period without any need for antihypertensive medications. Controversy prevails about the time frame needed for each patient to reach the normal blood pressure levels in the post-operative period. Some studies show that it may take up to six months to reach normal levels [11].

#### 4. Conclusion

Our case report shows, in an end stage renal disease patient who is on regular hemodialysis, pre transplantation bilateral nephrectomy can be used as a treatment option for refractory hypertension, where optimal pharmacotherapy and hemodialysis strategies have failed.

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#### Ethical approval

N/A.

#### Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the

written consent is available for review by the Editor-in-Chief of this journal on request.

#### Author's contribution

Study concept- Balagobi. B  
Data collection - Niroshan.V  
Data collection - Gowribahan. T  
Data collection - Weerasinghe N  
Data analysis - Thangarajah. B  
Data analysis – BavanthanV

#### Research registration

N/A.

#### Guarantor

Dr. B. Balagobi, Corresponding author.

#### Declaration of competing interest

None.

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