

CASE REPORTS

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Broken basket conundrum

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Abstract

Background: Broken basket during retrograde intrarenal surgery (RIRS) is a known complication. The literature regarding this common complication is limited. We report a case of broken basket and explain the technique by which we retrieved the broken basket fragment that was entrapped around the calculus. We also analyze at the prevention strategies and better management strategies.

Case presentation: A 62-year-old male underwent RIRS for a 2-cm right renal lower calyceal calculus. A tipless nitinol stone basket got broken and distal part got entrapped around the calculus when basketing was attempted. We proceeded with stone fragmentation by RIRS. After complete stone fragmentation, another tipless nitinol stone basket was used to grab the broken tip of distal basket fragment which was lying in the renal pelvis. The broken basket fragment could be retrieved out in toto.

Conclusions: Basketing large lower calyceal calculus should be attempted with caution. Partial or complete fragmentation of large calculus is preferable before basketing attempt. If the calculus is entrapped rather than forceful pulling, cutting the basket proximally near to the handle, followed by stone fragmentation, could minimize complications. Locating the broken tip of the basket fragment and grasping it makes the retrieval easier and safer.

Keywords: Broken basket, RIRS, Lower calyceal calculus, Tipless nitinol basket

1 Background

Retrograde intrarenal surgery (RIRS) is now commonly used in the management of renal calculus. The indications of RIRS have been expanding because of the advancements in flexible ureterorenoscope, laser and other accessories [1]. Basketing the lower calyceal calculus and repositioning it into favorable intrarenal position has been commonly used for more effective, faster and safer stone fragmentation [2]. Broken basket is a known complication during attempted basketing, and there have been reports of basketing a basket [3]. Despite being a relatively common complication, the literature regarding real-time experiences, preventive and management strategies regarding this problem is limited. We report this case where we had to deal with this complication of the broken basket during RIRS and discuss the method which we used to retrieve the broken basket fragment.

We also retrospectively analyze at the ways by which the complication could have been avoided altogether and during the course how the complication could have been better managed.

2 Case presentation

A 62-year-old male presented with complaints of bilateral loin pain. On computed tomography (CT) evaluation, he was found to have bilateral multiple angiomyolipomas (AML) and bilateral renal calculi of size 2 cm in right lower calyx and 2 cm in left lower calyx. It was decided to proceed with bilateral RIRS. RIRS on the left side could be completed uneventfully.

On the right side, we attempted to basket the calculus out of lower calyx using tipless nitinol stone basket (Ncircle-Nitinol Tipless Stone Extractor from cook medical, 2.2F × 115 cm – Model year 2019). The calculus could be engaged by the basket, and on attempting to pull the calculus out of the calyx, resistance could be felt. We then made an attempt to disengage the basket from the

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calculus by opening the basket and advancing it [4], but the basket had become entrapped around the calculus. In despair, one more attempt was made to pull the basket which was entrapped around the calculus forcefully and the basket got broken.

The distal 4 cm of the basket wire got entrapped around the calculus and got disconnected with the proximal unit of the basket. The proximal unit of the basket could be taken out in toto. A single attempt was made to remove the broken distal basket fragment with another tipless nitinol basket, but without success. Without further manipulation, we proceeded with RIRS and laser lithotripsy and fragmented the calculus completely in the lower calyx. After stone fragmentation, we located the broken tip of the distal basket fragment which was lying in the renal pelvis.

Then we introduced another tipless nitinol basket through the flexible ureterorenoscope and grasped the basket fragment at the broken tip (Fig. 1). The broken basket (Fig. 2) could then be retrieved out through the ureteral access sheath without causing ureteral trauma. A 6/26 Double-J stent was placed, and the procedure was completed. Postoperative X-ray did not show any radio-opaque shadow in the right renal area. The patient was discharged from the hospital on postoperative day 1. Double-J stent was removed at 1 month. Patient is under follow-up for the past 2 years, and he does not have any complaints. Follow-up CT abdomen and pelvis did not show residual calculus or basket fragments.

3 Discussion

RIRS is being used in the management of renal calculus in multiple clinical scenarios. It is safe and effective procedure with minimal morbidity to the patient. In patients with AML it is extremely useful as other procedures like percutaneous nephrolithotomy (PCNL) and extracorporeal shock wave lithotripsy (ESWL) have high complication rates of bleeding [5]. RIRS is now increasingly being

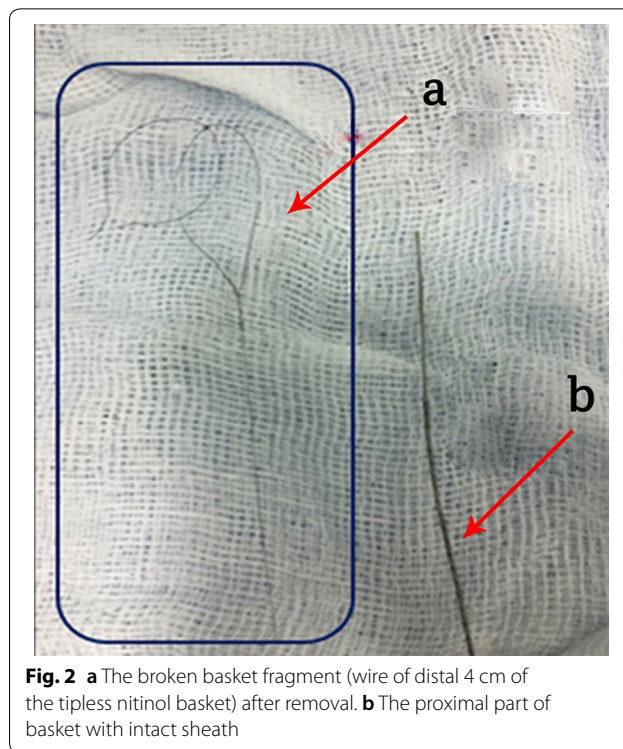


Fig. 2 a The broken basket fragment (wire of distal 4 cm of the tipless nitinol basket) after removal. b The proximal part of basket with intact sheath

used in management lower calyceal calculus [6]. Basketing the calculus out of lower pole calyces is a commonly used technique which allows the surgeon to place the calculus at a more favorable position in the kidney which is usually renal pelvis or upper calyx. It facilitates effective fragmentation and minimizes trauma to the flexible ureterorenoscope [2].

Stone basketing has a few known complications. Important intraoperative complications include entrapped and broken basket [7]. Although tipless baskets assume safer configurations, they break easiest [8]. In case of broken basket, there have been reports of

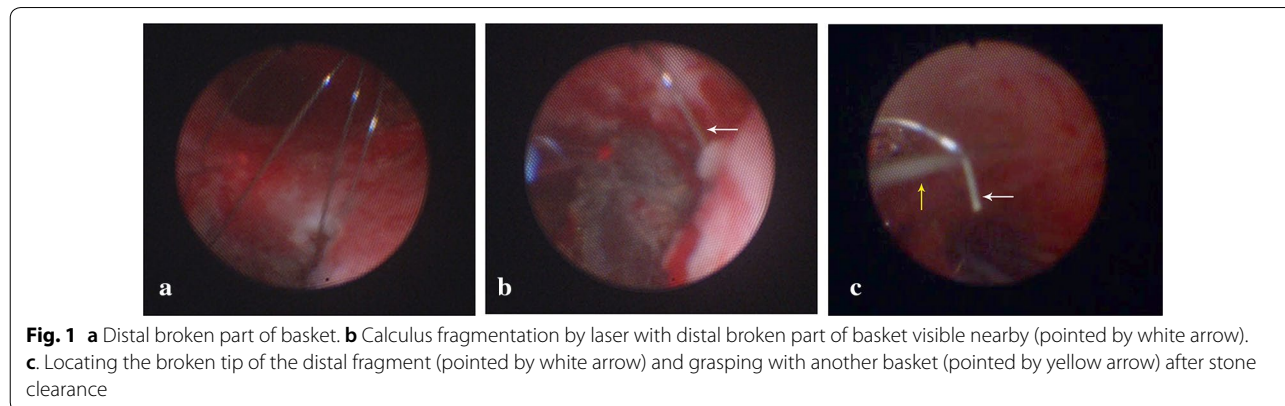


Fig. 1 a Distal broken part of basket. b Calculus fragmentation by laser with distal broken part of basket visible nearby (pointed by white arrow). c. Locating the broken tip of the distal fragment (pointed by white arrow) and grasping with another basket (pointed by yellow arrow) after stone clearance

performing PCNL to retrieve the broken basket tip [9]. But ours was a scenario complicated by the presence of concomitant renal angiomyolipoma.

If a basket is broken and entrapped, there has been suggestion in the literature, to deal with the calculus first before attempting to remove the broken basket tip [7]. In our case, also we fragmented the calculus, thereby freeing the entrapped basket fragment from the calculus, instead of making too many premature attempts to retrieve the broken basket fragment. We also felt too many attempts to retrieve the broken basket without fragmenting the calculus may result in more trauma or worse, another broken basket.

While retrieving the broken basket fragment, we recommend to identify the broken tip of the basket fragment that can be firmly grasped by another tipless nitinol basket or by any other suitable stone extraction devices. Holding the basket at the broken tip has multiple advantages. It is easy to locate the broken tip; the grasp is firm and allows removal under vision with less chances of slippage. It thus facilitates basket extraction with minimal attempts, without causing much trauma. We did not cut the basket with laser into multiple parts, as this could be tedious and time-consuming with additional risk of leaving retained fragments [7].

Retrospectively looking we feel we could have avoided this complication altogether by at least partial fragmentation of easily accessible part of the calculus first, thereby making the calculus smaller and then attempting to basket the calculus. Further, once the basket got entrapped around the calculus, we could have avoided pulling the basket forcefully. Instead it would have been prudent to have the basket wire cut proximally near the handle after the basket got entrapped (Fig. 3). It could have given two advantages. A gentle traction could have been maintained by an assistant from outside by holding of the basket wire proximally by hand, thereby easing lower calyceal stone fragmentation. Also, after stone clearance the basket wire could have been retrieved out by gentle hand traction obviating the need for basketing the basket (Fig. 4).

4 Conclusion

Basketing large lower calyceal calculus should be attempted with caution. In case of a large lower calyceal calculus, it is a good option to fragment the calculus partially or completely and then to attempt basketing. Forceful pulling of the entrapped basket is always to be avoided. In case of entrapped basket, it is advisable to cut the basket wire proximally and then to proceed with stone fragmentation. Locating the broken tip of the basket fragment and grasping, the tip makes the retrieval easier.

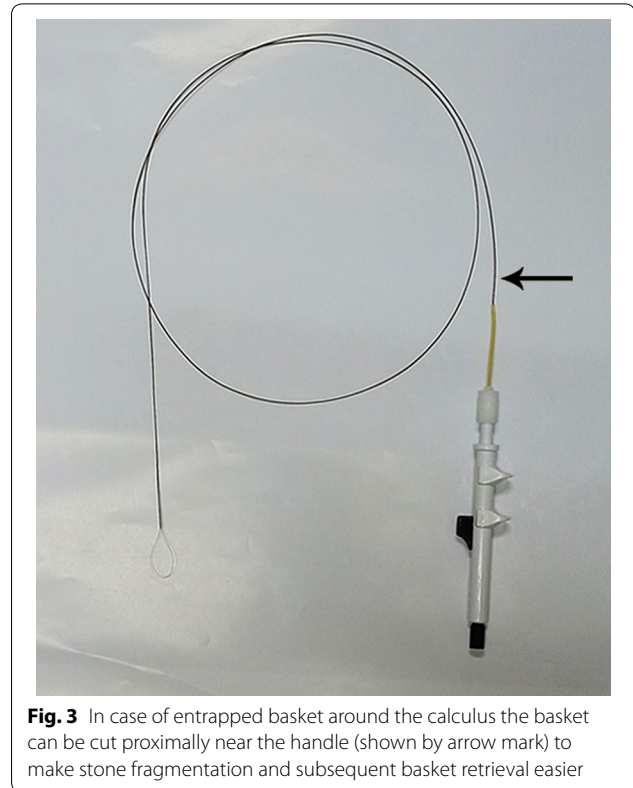


Fig. 3 In case of entrapped basket around the calculus the basket can be cut proximally near the handle (shown by arrow mark) to make stone fragmentation and subsequent basket retrieval easier

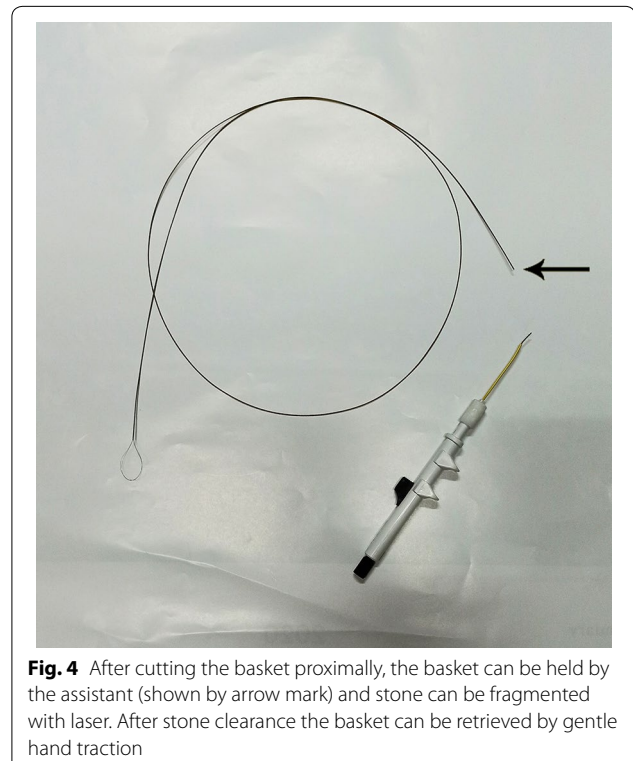


Fig. 4 After cutting the basket proximally, the basket can be held by the assistant (shown by arrow mark) and stone can be fragmented with laser. After stone clearance the basket can be retrieved by gentle hand traction

Abbreviations

AML: Angiomyolipoma; CT: Computed tomography; ESWL: Extracorporeal shockwave lithotripsy; PCNL: Percutaneous nephrolithotomy; RIRS: Retrograde intrarenal surgery.

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Competing interests

The authors declare that they have no competing interests.

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