Case Report

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Surgery Section

In Pursuit of the Broken Prong-Instrument Malfunction during Percutaneous Nephrolithotomy

SRIDHAR PANAIYADIYAN[1], PRABHJOT SINGH[2], BRUSABHANU NAYAK[3]

ABSTRACT

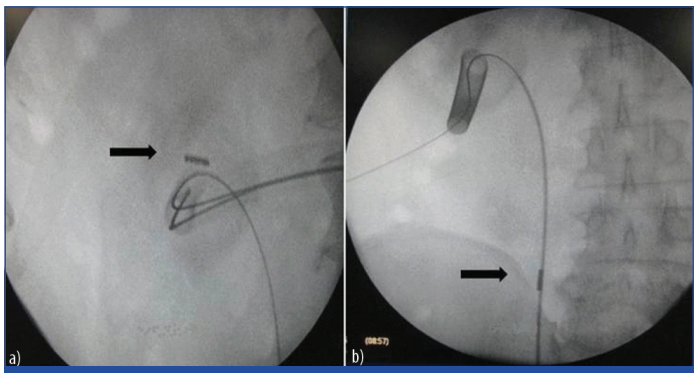
Endourological techniques are the mainstay treatment in the contemporary management of urological stone diseases. Instruments malfunction during endourological procedures, however, it appears that such incidences are underreported. Wear and tear caused by improper handling or factory defects may lead to instrument malfunction, resulting in serious accidents. Herein, a case of unexpected broken alligator forceps encountered during Percutaneous Nephrolithotomy (PCNL) is presented. Additional toilsome were done while retrieving the broken fragment, apart from complete stone clearance. To the best of author's knowledge, this is the first report on instrument malfunction during PCNL, successfully managed by various endourological armamentarium. The present case emphasises meticulous screening, proper handling of endourological instruments to avoid unexpected intraoperative malfunction.

Keywords: Alligator forceps, Endourological technique, Instruments

CASE REPORT

A 42-year-old gentleman presented with right flank pain of 8 months duration. There was no history of Lower Urinary Tract Symptoms (LUTS), fever, haematuria or lithuria. General and systemic examination were unremarkable.

On further evaluation, the patient was found to have a 2.8 cm right renal calculus and scheduled for PCNL. The standard approach for prone PCNL was performed and the stone fragmented with pneumatic lithoclast. Eleven French (Fr) alligator forceps was used to retrieve the stone fragments. In the midst of stone fragments retrieval, all of a sudden one of the alligator forceps prong broke and got dislodged into the depth of Pelvicalyceal System (PCS) [Table/Fig-1a]. Attempts for retrieval led to the downward migration of the broken prong into the ureter to the level of fourth lumbar (L4) vertebra [Table/Fig-1b].



[Table/Fig-1]: a) Broken prong in the pelvicalyceal system (PCS). b) Broken prong in the ureter at the fourth lumbar (L4) vertebra.

As the broken fragment was not accessible from the PCNL tract, a ureteroscopic approach was planned. The remaining stone fragments in the PCS were retrieved with the help of a new 11 Fr alligator forceps and a nephrostomy tube was secured to the skin. The patient was turned back to lithotomy position and on attempting semirigid ureteroscopy, disappointingly the prong retropulsed back into the renal pelvis. Also, the attempted flexible ureteroscopic removal of the prong via basket failed due to undue stretch on the ureteral mucosa just beyond ureteropelvic junction, demanding the nephroscopic approach again. The stone was pushed back to the PCS and to prevent the downward migration again, a 6 Fr ureteral balloon catheter was placed and the balloon inflated below the level of the broken prong. The patient was then placed back to the prone position and the broken fragment retrieved through the nephrostomy tract [Table/Fig-2]. A 6 Fr Double J (DJ) stent was placed.

[Table/Fig-2]: Broken prong after retrieval.

Patient did not encounter any intraoperative or postoperative complications and was discharged on the third postoperative day. At two weeks follow-up, the DJ stent was removed.

DISCUSSION

Instrument malfunction and damage are considered defects of surgical instruments. The overall incidence of critical adverse events associated with defective surgical instruments including all types of surgery is estimated to be 2 out of 19,474 (0.01%). This means an incidence of 10 in every 100,000 operations. The incidence of defective instruments in urological and endoscopic surgery is 0.31% and 0.53% respectively [1].

Although the incidence is low, instrument malfunction has led to serious medical accidents during surgery. These include direct tissue damage, critical bleeding, and retained pieces of broken instruments resulting in auxiliary procedures, increased anaesthesia

time and its resultant morbidity [1]. Surgical instruments are usually durable. However, inappropriate handling, wear and tear during usage constitutes the main causes of instruments damage. Other causes being inadequate inspection and factory defects [2].

Surgical instruments wear out gradually through a process of fatigue, fracture, and erosive corrosion of metal as evidenced by microscopic striations in fatigue, cracks in fracture and microscopic corrosion pits or macroscopic discoloration in corrosion respectively [1]. In present case, a PCNL alligator forceps was used. The broken prong migrated into the ureter, leading to tiresome auxiliary procedures in retrieving it, resulted in increased anaesthesia and operating room time. Though the present case did not encounter any morbidity, which lead to a change in our unit policy in the meticulous inspection of the instruments before any procedure and, thus ensuring proper handling of the instruments during the procedure to prevent such mishap.

Park SY et al., reported a case of malfunctioning of robotic arms and breakage of a robotic needle driver concerned with robotic-assisted laparoscopic radical prostatectomy [3]. In particular to endourology, Anderson JK et al., reported a case of fractured flexible ureteroscope with locked deflection requiring an open incision for retrieval [4]. However, there is a dearth of literature on medical accidents resulting from endourological instruments malfunction. Further, there is no existing literature on PCNL instrument malfunction.

CONCLUSION

Surgical instrument malfunction and damage can occur during any endourological procedure. Meticulous screening preoperatively and proper handling intraoperatively could prevent medical accidents caused by defective surgical instruments.

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PARTICULARS OF CONTRIBUTORS:
1. Senior Resident, Department of Urology, All India Institute of Medical Sciences, New Delhi, India.
2. Associate Professor, Department of Urology, All India Institute of Medical Sciences, New Delhi, India.
3. Assistant Professor, Department of Urology, All India Institute of Medical Sciences, New Delhi, India.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:
Dr. Prabhjot Singh,
Department of Urology, Teaching Block, 5th Floor, AIIMS, New Delhi, India.
E-mail: drprabhjotsingh@gmail.com

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