



# The Two-point Fluoroscopy Technique for Ureteroscopy

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## BACKGROUND

Since the widespread use of x-rays for diagnostic and therapeutic purposes and the understanding of their potential harm, there is a raising concern regarding the excessive exposure of the population to ionizing radiation.

For many years, we have been using in our Department a “Two-Point fluoroscopy Technique (TPT)” on ureteroscopies in terms of limiting the exposure of the patient and the team to ionizing radiation during this procedures. Indeed, we have noted a significant decrease in fluoroscopy time and radiation dose delivered since the implementation of this technique.

To effectively validate this observations, we conducted this prospective study comparing the TPT to the regular accepted technique.

## MATERIALS & METHODS

During ureteroscopy, the position of the c-arm is usually changed according to the specific anatomy required on each step. During the repositioning of the c-arm, significant amount of radiation is delivered while adjusting the image to the different anatomic structures.

With our technique, the c-arm is positioned over a fixed cephalo-caudal axis at the beginning of the procedure and then moved between 2 predetermined anatomic landmarks (“points”), in which the whole area from the ureteral orifice to the upper pole of each kidney is included (in normal anatomic conditions). This way, the amount of radiation is limited to the minimum required for the specific step in the surgery, preventing unnecessary fluoroscopy time during repositioning of the c-arm.

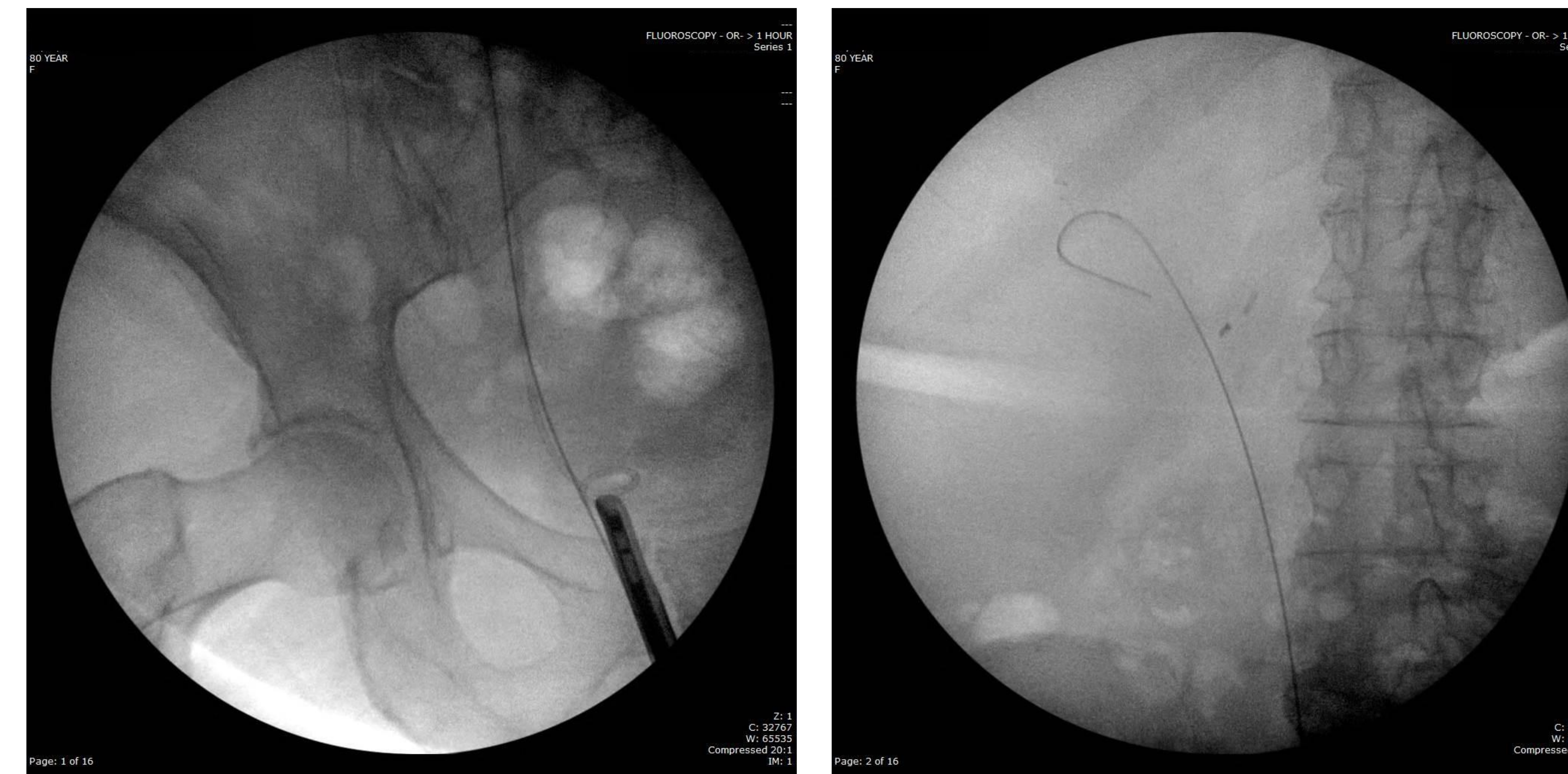
Using this technique, we have recorded the fluoroscopy time and radiation dose applied in ureteroscopic cases and the results were compared to similar procedures in which this technique was not implemented.



Figure 1: Marks on the C-arm's collar (Red arrow).

## TECHNIQUE

- At the beginning of the procedure, 2 scout fluoroscopic images are taken and the limits (caudal and cephalad) are set.
- Two physical marks are made on the c-arm's collar (at the degrees' rule). These points are called “point 1” (caudal) and “point 2” (cephalad), being the caudal limit of point 1 the lower limit of the symphysis pubis and the caudal limit of point 2 the upper limit of point 1.
- The intrinsic articulation of the fluoroscope is used to rotate the c-arm in cephalo-caudal direction and vice-versa (instead of moving the whole machine).
- During the procedure, the surgeon indicates the x-ray technician which point should be shown in each step and this way, the amount of radiation is limited to the minimum required for the specific step and indication.



2a.

2b.

Figure 2: Anatomic Landmarks of The “Two Point Technique”. a. Point “1”: Its lower limit corresponds to the symphysis pubis. b. Point “2”: Its lower limit slightly overlaps with the upper limit of point 1.

## RESULTS

From September 2017 to March 2018, 33 patients with uncomplicated ureteral or kidney stones underwent ureteroscopy:

- 15 patients using TPT (“TPT group”)
  - 18 patients NOT using TPT (“NON-TPT group”)
- The mean fluoroscopy time on TPT vs NON-TPT was 46.56 vs 85.93 seconds respectively (p=0.0473).
- The mean radiation dose on TPT vs NON-TPT was 7.59 vs 21.58 mGy respectively (p=0.0371).

**CONCLUSION:** The implementation of The “Two Point fluoroscopy Technique” together with low dose settings may significantly lower the amount of ionizing radiation delivered during ureteroscopy.

