

*Yin A, et al. Which renal access technique for percutaneous nephrolithotomy is more difficult to teach using simulation in surgical training?*

## **APPENDIX**

PCNL access instructions:

### **Bull's eye**

- 1- Retrograde and pause ventilation at desired kidney position
- 2- Identify posterior-superior calyx
- 3- Angle C-arm 30 degrees towards you
- 4- Add a 5–10-degree tilt cranial (sup) or caudal (inf pole)
- 5- Insert needle over targeted calyx
- 6- Introduce needle through skin — bull's eye —
- 7- Angle C-arm back to 0 degrees to assess depth of needle insertion

### **Triangulation**

- 1- Retrograde and pause ventilation at desired kidney position
- 2- Identify posterior-superior calyx
- 3- Angle C-arm 30 degrees towards head of the patient and towards you
- 4- Choose safe insertion site and angle towards desired calyx
- 5- Angle C-arm back to 0 degrees away from you
- 6- In the same axis, move needle towards desired calyx
- 7- Back to 30 degrees towards you, advance needle through skin

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<b>Supplementary Table 1. PCNL-GRS score</b>					
	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>Identify anatomy</b>	No knowledge		Identified most landmarks		Identified all landmarks
<b>Plan needle puncture</b>	Targeting incorrect calyx or wrong angle. Multiple needle passes		Eventually targets correct calyx at appropriate angle. A few needle passes		Correct calyx targeted. Needle at appropriate angle. Minimal needle passes
<b>Use of instruments</b>	Difficulty using and coordinating access needle and guidewire		Able to access needle and guidewire although awkward at times		Able to use needle and guidewire smoothly
<b>Ability to perform tasks</b>	Frequently stopped or needed advice/assistance from examiner		Performed the procedure with little advice/assistance from the examiner		Performed the procedure with no advice/assistance from the examiner
<b>Overall performance</b>	Poor		Average		Excellent