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The "Inside-outside" Sign

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ABSTRACT

We describe a radiological sign, "inside-outside sign," observed during the cannulation of an expandable contrast-filled tubular structure in the human body. In this optical illusion, a catheter or guidewire appears to be outside the lumen when it is inside the lumen in reality. Knowing this rare optical illusion is essential to avoid mistaking it for a catheter or guidewire outside the lumen.

Keywords: Illusions in radiology, Interventional radiology, Transjugular intrahepatic portosystemic shunt, Portogram, Percutaneous transhepatic biliary drainage

INTRODUCTION

We believe in what our eyes see. Sometimes what we see is an optical illusion resulting in a false interpretation of the image.[1] But curiosity always remains among us to find the cause behind that particular event or appearance. The outcome may be fruitful or dangerous at times due to the failure of heuristic principles.[2] Although with modern technologies, the images are getting better, day by day, they must be interpreted carefully as they may represent optical illusion rather than an actual representation. Here, we describe a radiological sign "inside-outside sign" to help identify a pitfall in a catheter's imaging appearances within an expandable structure.

INSIDE-OUTSIDE SIGN

"Any catheter or guidewire when passed into a curved hollow viscus or blood vessel tends to stretch the lumen on the concave side and sometimes may falsely appear to be outside the confines of the contrast filled lumen due to the inherent rigidity of the catheter or guidewire." This may potentially concern the person performing the procedure of a possible perforation. We describe this appearance in angiography as an "inside-outside sign." This sign was observed in the portal vein during portography and in the C loop of the duodenum during the percutaneous transhepatic internal-external biliary drainage procedure.

During transjugular intrahepatic portosystemic shunt (TIPS), once the right branch of the portal vein is accessed, a guidewire is passed and negotiated into the superior mesenteric vein or splenic vein. An angiographic pigtail catheter is then exchanged over the wire into the main portal vein to obtain a portogram.[3] Sometimes on a portogram, the angiographic pigtail catheter or guidewire may appear to be outside the lumen of the portal vein on the inferior aspect [Figure 1]. A similar appearance may be observed during a direct percutaneous transhepatic portogram.

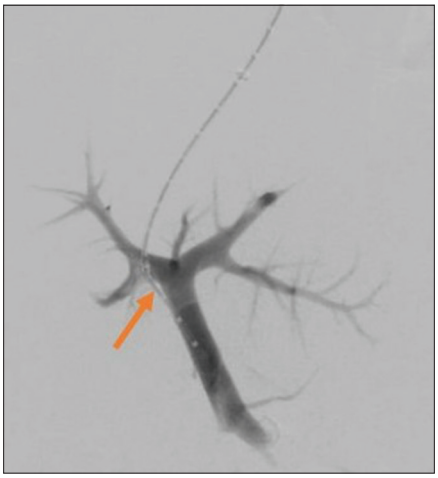

Figure 1: A 17-year-old patient who underwent transjugular intrahepatic portosystemic shunt. Angiographic pigtail catheter (arrow) appears outside at the confluence of the right and left portal veins.

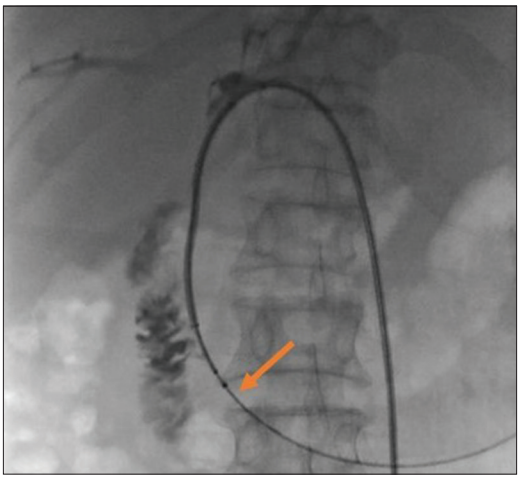

Figure 2: A 49-year-old patient who underwent percutaneous transhepatic biliary drainage internalization. Amplatz guidewire (arrow) appears outside the second and third parts of the duodenum after crossing the ampulla.

During external-internal percutaneous transhepatic biliary drainage,[4] at times, the tube appears to be outside the confines of the second and third parts of the C loop of the duodenum [Figure 2]. This finding is only observed on the concave side of the portal vein or duodenum. In addition, the direction of the X-ray is in profile, not "end-on" to result in this appearance.

The reason for this phenomenon is the stretching of the lumen by the rigid catheter or guidewire. As the catheter is opposed along the wall, it prevents contrast filling in that region, giving rise to this appearance of the catheter being outside the opacified lumen. Perhaps, it is also observed only when the structure is relatively fixed. The contrast does not fill the lumen portion immediately next to the catheter due to the apposition of the epithelial or endothelial surfaces [Figure 3]. Free manipulation of catheter or wire both proximally and distally can make the operator confident that the catheter or wire is in the lumen and not outside; in the latter situation, the manipulation would have caused the catheter or wire to buckle or lead to difficult manipulation. In addition, when TIPS is performed under ultrasound guidance, it is easy to ensure that the catheter or guidewire is within the lumen of the portal vein.[5]

Lack of knowledge about this appearance and failed heuristics[2] could potentially induce worry. Some might even consider repositioning the catheter or guidewire, which might lead to unnecessary prolongation of the duration of the procedure and lose the access that was gained initially. One should be aware of such an event and be confident that the catheter is within the lumen to avoid an eventful episode. The purpose of naming such an appearance as a sign is to highlight its importance and help others avoid this pitfall.

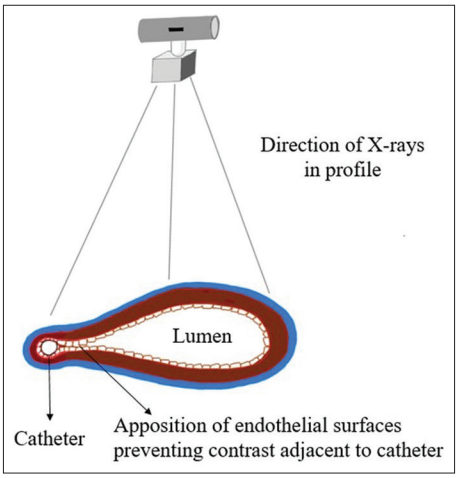

Figure 3: Schematic diagram of the cross-section of a vein representing apposition of endothelial surfaces next to the stretched wall preventing contrast adjacent to the catheter.

CONCLUSION

Our role in patient management starts with what we see in the images and how we interpret the images. Hence, knowledge of visual illusions and signs like inside-outside sign would help in effective patient care.

Declaration of patient consent

Patient's consent not required as patients identity is not disclosed or compromised.

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Conflicts of interest

There are no conflicts of interest.

REFERENCES

1. Buckle CE, Udawatta E, Straus CM. Now you see it, now you don't: Visual illusions in radiology. Radiographics 2013;33:2087-102.
2. Itri JN, Patel SH. Heuristics and cognitive error in medical imaging. AJR 2018;210:1097-105.
3. Funaki B. Trans jugular intrahepatic portosystemic shunt. Semin Intervent Radiol 2008;25:168-74.
4. Keshava SN, Mammen S. Percutaneous placement of a plastic biliary stent. Indian J Radiol Imaging 2011;21:231-3.
5. Keshava SN, Kota GK, Mammen T, Jeyamani R, Moses V, Govil S, *et al*. Direct intrahepatic cavo-portal shunts in Budd-Chiari syndrome: Role of simultaneous fluoroscopy and trans-abdominal ultrasonography. Indian J Gastroenterol 2006;25:248-50.

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