Artifacts In Peripheral Vascular Ultrasound Caused By EKOS

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Introduction

For patient with DVT, EkoSonic Endovascular System (EKOS) is an attracting newly-emerging therapy. EKOS will deliver ultrasound energy to pump urokinase into lesion to achieve active thrombolysis. Here we report one case with severe artifacts on ultrasound image caused by EKOS machine.

Case Report

A 48 year-old man with a history of chronic hepatitis B was admitted due to painful swelling of right leg for 6 days. D-dimer level was > 10000 ng/ml.. Vascular ultrasound revealed thrombus over right common femoral vein (CFV), superficial femoral vein (SFV) and popliteal vein (pop v). (Figure 1).

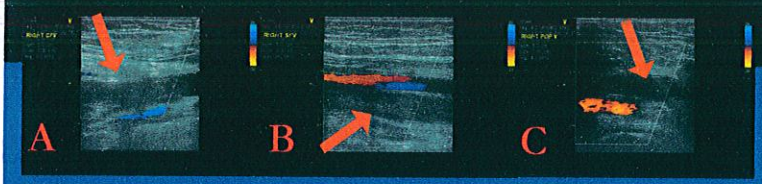

Figure 1. Vascular echo disclosed thrombus over (A) right CFV (B) right SFV (C) right pop V.

Protein S deficiency was noted (protein S: 7.6% (normal > 60%). Hyperhomocystemia was noted. (homocysteine 13.5 umol/L (normal 4.45-12.42). Other coagulation panel and immune studies were negative, including ANA, anti-phopholipid Ab, protein C, anti-thrombin III, and cryoglobulin level. Heparin was given to maintain aPTT 55-75 sec but in vain and PTA was performed. A 7Fr sheath was inserted to LCFV and a G2X retrievable IVC filter was implanted. Angiography disclosed thrombus over RSFV. (Figure 2)

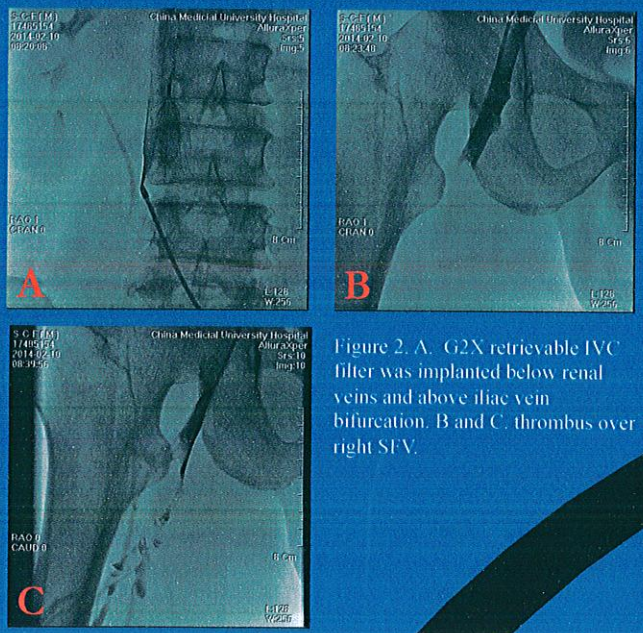

Figure 2. A. G2X retrievable IVC filter was implanted below renal veins and above iliac vein bifurcation. B and C. thrombus over right SFV.

A 4 Fr Fountain catheter was advanced to right SFV and urokinase infusion was given overnight, however much residual thrombus was still noted over right SFV (Figure 3)

Figure 3. (A) 4Fr Fountain catheter in RSFV to deliver urokinase (B-D) residual thrombus over RSFV

After serial balloon dilatation, EKOS catheter was placed over RSFV with urokinase infusion and EKOS machine was turned on to deliver ultrasound energy to pump urokinase directly into RSFV and R pop v. (Figure 4)

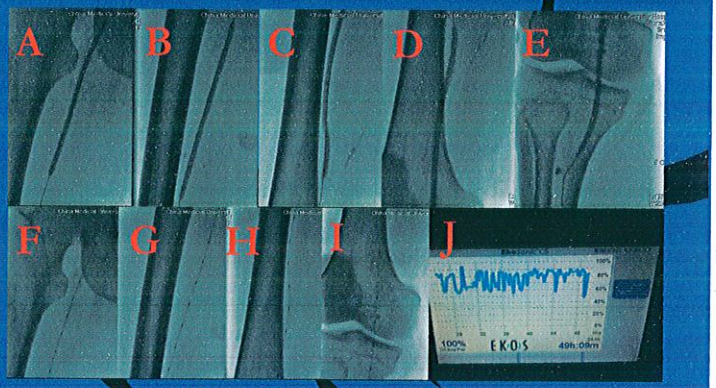

Figure 4. (A-E) Serial balloon dilatation of RSFV for fragmentation of thrombus. (F-I) EKOS catheter (J) EKOS machine showing average power.

We performed routine ultrasound follow up at bedside. However, severe artifacts were noted. We thought it was malfunction of our ultrasound machine but the engineer can not find anything wrong. Finally we found no more artifacts were noted after we turned off EKOS machine. (Figure 5)

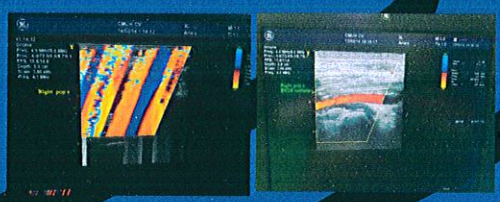

Figure 5. Ultrasound study of right popliteal vein. (A) When EKOS is turned on. (B) When EKOS is turned off.

Conclusions

EKOS will deliver ultrasound energy from vessel lumen, which will interfere the ultrasound beam from ultrasound probe, hence cause artifacts. One should turn off EKOS machine when vascular ultrasound is performed.