Surgicel mimicking early onset prosthetic valve endocarditis: case report

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Background
Surgicel is one of the commercial forms of oxidized regenerated cellulose used as a bioabsorbable topical haemostatic agent during surgical procedures. However, its presence can mimic an abscess, tumour, lymph node or retained foreign body on imaging studies. The challenge in cardiac surgery is to differentiate the haemostatic material from an abscess that might be mistaken for an early onset prosthetic valve endocarditis.

Case summary
A 56-year-old woman was admitted to our department for a suspicion of early onset prosthetic valve endocarditis after an aortic valve replacement. An early clinical and biological improvement, features on a chest computed tomography scan, as well as a surgical correlation were able to rectify the diagnosis. The acute fever was linked to urinary tract infection, whereas the periaortic echogenic mass shown at the transoesophageal echocardiography corresponded to Surgicel.

Discussion
Oxidized regenerated cellulose can mimic an abscess on cardiac imaging, especially when used in excess during cardiac surgery. Fortunately, some radiographic features can help differentiate the haemostatic material from an abscess. Hence, sharing the use and location of Surgicel between the surgeon, radiologist, and cardiologist is very important and necessary to make the correct diagnosis.

Keywords
Surgicel • Abscess • Early onset prosthetic valve endocarditis • Haemostatic agents • Case report

Learning points
• Surgicel as described in literature can mimic an abscess. The possibility of an excess use of Surgicel in cardiac surgery should be considered in case of a suspicion of infective endocarditis.
• Sharing the use and location of Surgicel between the surgeon, radiologist, and cardiologist along with a clinical assessment is very important to differentiate between an abscess and the appearance of Surgicel, and to avoid unnecessary surgical reinterventions.

Introduction
Surgicel is an absorbable local haemostatic that belongs to oxidized regenerated cellulose (ORC) products, used to control capillary, venous, and small arterial bleeding, and can be cut into strips or smaller pieces for placement. The duration of its absorption depends on the amount of material used, the degree of local blood circulation, and the tissue bed itself. However, this agent can mimic...
an abscess on cardiac imaging when used in cardiac surgery. Herein, we report the case of a patient who benefitted from a Surgicel packing around a prosthetic aortic valve (Figure 1) and was erroneously diagnosed with early prosthetic valve endocarditis.

Timeline

| Day 1 | The patient, presenting with acute fever, was admitted for suspicion of an early onset prosthetic valve endocarditis (2 months after a surgery of aortic valve replacement with mitral and tricuspid annuloplasty for a severe rheumatic aortic stenosis) |
| Day 2 | A transoesophageal echocardiography (TOE) was performed showing a periaortic echogenic mass which was initially diagnosed as an abscess |
| Day 4 | Clinical course was favourable. The acute fever was linked to a urinary tract infection and the periaortic mass was related to the Surgicel appearance |
| Day 8 | Antibiotics were stopped. The diagnosis of early onset prosthetic valve endocarditis was ruled out |
| 3 months later | The patient was asymptomatic with negative infectious parameters. A TOE was performed showing a decrease in size of the Surgicel |

Case presentation

A 56-year-old woman had a history of a severe symptomatic rheumatic aortic stenosis and underwent a mechanical aortic valve replacement with mitral and tricuspid annuloplasty 2 months before her admission to our department. She had no other past medical history.

Two months later, she presented with acute fever. Her vital signs were as follows: admission temperature of 38.8°C, blood pressure of 110/50 mmHg, regular pulse of 95 b.p.m., and respiratory rate of 16 breaths per minute. On cardiovascular examination, the mechanical valves produced very audible opening and closing clicks with no new murmur and no signs of heart failure. There were no other anomalies on physical examination. A transoesophageal echocardiography (TOE) was indicated since the transthoracic echo did not detect any abnormality and showed a periaortic echogenic mass which was initially diagnosed as an abscess (Figure 2). A chest computed tomography scan (CT scan) revealed an ill-defined heterogeneous mass at the level of the aortic ring (Figure 3). A complementary full body scan performed to assess an extension of the infective endocarditis did not reveal any abnormality. We did not perform an 18F-fluorodeoxyglucose positron emission tomography with CT because its use may provide false positive findings caused by post-surgical inflammation. An assessment of inflammatory markers found high C-reactive protein (CRP) and erythrocyte sedimentation rate (ESR) levels of 55.8 mg/L and 30 mm at the first hour, respectively (for a normal CRP < 6 mg/L and a normal ESR < 20 mm). White blood cell count, complement (C3, C4), and rheumatoid factor levels were normal. The blood culture was sterile. However, a midstream urinalysis was positive for urinary tract infection caused by a multisensitive strain of Escherichia coli. Therapeutically, intravenous antibiotics were administered to treat an early onset prosthetic valve endocarditis. An early clinical and biological improvement (noticed after 3 days), features of a chest CT scan, as well as a surgical correlation were able to rectify the diagnosis.

After 1 week of treatment, antibiotics were stopped. Urinalysis and CRP level controls were negative. Clinical course was favourable. The acute fever was linked to urinary tract infection, whereas the periaortic echogenic mass shown at the TOE corresponded to Surgicel. The patient was seen 3 months later, she was asymptomatic with negative infectious parameters. A TOE performed 5 months after the aortic valve replacement showed a decrease in size of the Surgicel appearance which could not be possible in the case of an untreated abscess (Figure 4). Indeed, our patient had a Surgicel packing around aortic prosthetic valve (Figure 1) and was erroneously diagnosed with early onset prosthetic valve endocarditis.

Discussion

Oxidized regenerated cellulose products are used to control capillary, venous, and small arterial bleeding, and can be cut into strips or smaller pieces for placement. They need to be applied dry and are
absorbed within 4–8 weeks. However, ORC can mimic an abscess which highlights the importance of sharing information regarding the use of surgical haemostatic material. Fortunately, some radiographic features can help differentiate the haemostatic material from an abscess (Table 1).

On ultrasound imaging, ORC is seen as an echogenic mass with posterior reverberation artefact from the gas, mimicking a gas-containing abscess. In addition, there may be surrounding free fluid. On CT scan, Surgicel appears as a collection of fluid and gas mimicking an abscess. It takes the shape of a unifocal collection of gas with gas bubbles arranged in linear patterns without any air-fluid level, as opposed to a postoperative abscess which shows the presence of air-fluid levels and scattered air bubbles.

On magnetic resonance imaging, Surgicel has a short T2 relaxation time leading to a hypointense mass on T2-weighted images, while an abscess is typically T2 hyperintense.
Nuclear imaging can be used as a diagnostic tool for the detection of endocarditis. However, its use in patients with recent prosthetic valve endocarditis (<3 months) may provide false positive findings caused by post-surgical inflammation. Its usefulness in this case is especially interesting the detection of embolization and/or metastatic infection.

In fact, the problem related with Surgicel in our case, as described previously, comes from its excessive use. It may be difficult to distinguish a Surgicel accumulation from a tumour or an abscess or an intramural haematoma using X-rays, sonograms, and CT scans. We also notice in our case report that the duration of Surgicel resorption can exceed 8 weeks. Therefore, we recommend to limit the use of Surgicel, otherwise, share all the necessary information regarding its use between the surgeon, cardiologist, and radiologist.

### Conclusion

In conclusion, the use of Surgicel in cardiac surgery can erroneously lead to the diagnosis of an early onset prosthetic valve endocarditis, therefore to excessive surgical reinterventions. Continuous information exchange between the surgeon, the cardiologist, and the radiologist about the use and location of haemostatic agents during surgical procedures is imperative to ensure appropriate evaluation of radiographic findings and avoid exorbitant treatments.

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**Table 1** Radiographic features at ultrasound imaging, computed tomography scan, and magnetic resonance imaging to differentiate Surgicel appearance from abscess

| Ultrasound imaging | CT scan | MRI |
|--------------------|---------|-----|
| **Surgicel**       | **Abscess** | **Abscess** |
| Echogenic mass with posterior reverberation artefact from the gas | Unifocal collection of gas | Similar findings of an abscess caused by gas forming organisms |
| There may be surrounding free fluid | Linear pattern without any air-fluid level | Presence of air-fluid levels |
| **Abscess** | | Presence of scattered air bubbles |
| Short T2 relaxation time leading to a hypointense mass on T2-weighted images | | T2 hyperintense |

CT, computed tomography; MRI, magnetic resonance imaging.
Lead author biography

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Supplementary material

Supplementary material is available at European Heart Journal - Case Reports online.

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References

1. Shah V. Surgical Hemostatic Material. Radiopaedia 2017;rID: 54794.
2. Ibrahim MF, Aps C, Young CP. A foreign body reaction to Surgicel mimicking an abscess following cardiac surgery. Eur J Cardiothorac Surg 2002;22:489–494.
3. Vyas KS, Saha SP. Comparison of hemostatic agents used in vascular surgery. Expert Opin Biol Ther 2013;13:1663–1672.
4. Mausner EV, Yitta S, Szywotzky CM, Bennett GL. Commonly encountered foreign bodies and devices in the female pelvis: MDCT appearances. AJR Am J Roentgenol 2011;196:461–470.
5. Otto A, Reimer EM, O’Malley CM, Tkach JA, Gill IS. MR characteristics of oxidized cellulose (Surgicel). Am J Roentgenol 1999;172:1481–1484.
6. Habib G, Lancellotti P, Antunes MJ, Bongiorni MG, Casalta J-P, Del Zotti F et al. 2015 ESC Guidelines for the management of infective endocarditis: the Task Force for the Management of Infective Endocarditis of the European Society of Cardiology (ESC). Endorsed by: European Association for Cardio-Thoracic Surgery (EACTS), the European Association of Nuclear Medicine (EANM). Eur Heart J 2015;36:3075–3128.

Slide sets: A fully edited slide set detailing this case and suitable for local presentation is available online as Supplementary data.

Consent: The author's confirm that written consent for submission and publication of this case report including image(s) and associated text has been obtained from the patient in line with COPE guidance.

Conflict of interest: none declared.