CASE REPORT

Endocarditis following IUD insertion in a patient with tetralogy of Fallot

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SUMMARY

The role of antibiotic prophylaxis for prevention of infective endocarditis is unknown. Endocarditis prophylaxis is recommended for certain high-risk individuals prior to dental procedures. To our knowledge, this is the first case reported in the literature of a patient with complex congenital heart disease developing endocarditis in the period immediately following otherwise uncomplicated intrauterine device insertion.

BACKGROUND

This is the first report of a patient with complex congenital heart disease developing infective endocarditis (IE) after an uncomplicated intrauterine device (IUD) insertion. Current guidelines do not recommend antibiotic prophylaxis prior to IUD insertion procedures for high-risk patients. Ongoing reporting and review of IUD complications in high-risk patients is essential to determining whether prophylaxis might be indicated, as many more women are using IUDs in this country.¹

CASE PRESENTATION

A 25-year-old woman with a history of tetralogy of Fallot with absent pulmonary valve syndrome presented with 10 days of fevers and chills and was admitted to the hospital. She had two prior surgical repairs; the first surgery occurred at age 2 and included ventricular septal defect repair and creation of a composite right ventricular (RV) to pulmonary artery (PA) conduit. A second surgery to upsize the allograft to a bioprosthetic conduit occurred 7 years later. She had no prior history of endocarditis. She saw a dentist every 6 months, with concurrent antibiotic prophylaxis for IE, and had last had dental care 4 months previously. She underwent an uncomplicated outpatient IUD insertion 12 days before her fevers began. A procedure note reported a levonorgestrel-releasing intrauterine system had been inserted after the cervix was prepared with Betadine and a local paracervical block was used for anaesthesia. Consistent with clinical recommendations, she did not receive antibiotic prophylaxis at the time of IUD insertion. When she first developed fevers, she assumed she had a viral syndrome, as she was also experiencing upper back pain and myalgias. Her fevers and chills persisted, she became more concerned and presented to the hospital. An urgent transthoracic echocardiogram showed 'mobile echodensities' along the prosthetic pulmonic valve at the end of the RV-to-PA conduit

and three sets of blood cultures all turned positive around 14 hours for gram positive cocci, which were identified as *Streptococcus mitis*. A dental consultation was requested and thorough examination and dental X-rays showed healthy teeth and gingiva with no active or chronic infections. A transvaginal ultrasound showed a well-placed IUD with no sign of infection.

OUTCOME AND FOLLOW-UP

She was treated with ceftriaxone and gentamicin for a planned 6 week course for *streptococcal* prosthetic valve endocarditis. During the course of treatment, her vegetation increased in size; she eventually underwent a revision of her RV-PA conduit around 8 weeks after diagnosis. Her postoperative course has been uneventful.

DISCUSSION

Endocarditis following IUD insertion has rarely been reported in the literature. The case presented raises the possibility that transient bacteraemia at the time of IUD insertion may have led to IE in this patient. The mechanism may be similar to that following dental work or tooth brushing, where abrasions in the mucosa lead to transient bacteraemia with local bacterial flora, that are then able to attach to a susceptible valve. Two prior case reports suggest a relationship between IUD insertion and development of endocarditis; however, in both cases the patients' IUD insertions were complicated by extensive endometritis which was thought to have been the source of ongoing bacteraemia eventually leading to endocarditis.^{2,3} The patient presented here had an uncomplicated IUD insertion, but developed IE with an organism known to be found as part of certain vaginal microbiomes.⁴

There has long been concern that IUD insertion might carry an elevated risk of IE for high-risk patients. A 1987 study examined serial blood cultures from 23 healthy women (without heart disease) after IUD insertion and found transient bacteraemia with typical vaginal organisms in 13% of the women.⁵ A 2008 prospective cohort study in India of 40 women with cardiac disease administered antibiotic prophylaxis with ampicillin and gentamicin for IE 1 hour prior to IUD insertion. Blood cultures were drawn at 1 hour after insertion and all remained negative. The follow-up period for the women was 4 years and there were no confirmed cases of endocarditis during this period.⁶ A retrospective review of 470 women with congenital

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heart disease, valvular heart disease or rheumatic heart disease who had long-acting reversible contraceptive placement (of which 433 were IUDs) at the University of Washington found no confirmed cases of IE. Patients did not receive antibiotic prophylaxis prior to insertion of the devices. Only one patient developed IE in this cohort and did so 51 days after IUD insertion and the source was felt 'not likely gynaecological in origin'.⁷

Risk of IE is felt to be related both to cumulative low-grade bacteraemia from activities of daily living like tooth brushing, as well as episodic high-grade bacteraemia following certain invasive procedures like dental procedures. Current recommendations from the Infectious Diseases Society of America (IDSA) and the American Heart Association (AHA) and European Society of Cardiology now recommend prophylaxis only prior to certain dental procedures in the highest risk patients, including patients with prosthetic cardiac valves, previous IE, or unrepaired cyanotic congenital heart disease (CHD) or within the first 6 months of completely repaired CHD.^{8–10} The guidelines point out that the overall risk of IE following dental procedures is quite low, and there is a lack of high quality evidence proving the benefit of antibiotic prophylaxis for dental procedures. However, given the low rate of IE following invasive procedures, proving a benefit of prophylactic antibiotics would require yet-unperformed large scale trials. Experts therefore currently do not recommend antibiotic prophylaxis, even in these high-risk groups, for respiratory tract, gastrointestinal tract or genitourinary tract procedures.^{9 10}

Learning points

- ▶ We believe this is the first reported case of endocarditis developing following uncomplicated intrauterine device (IUD) insertion in a patient with complex congenital heart disease.
- ▶ Endocarditis following IUD insertion is rare but may be seen more frequently as more women, including women with complex congenital heart disease, undergo placement of IUDs.
- ▶ The role of antibiotic prophylaxis for high-risk patients remains unknown but might be considered for certain high-risk patients undergoing IUD placement, in consultation with their cardiologists and/or infectious disease specialists, given the high morbidity associated with developing endocarditis.

As higher risk individuals, including those with cyanotic heart disease and prosthetic valves, live longer and inevitably undergo more invasive procedures (such as IUD placements), it will be important to closely study their risk for IE with common organisms and to determine if antibiotic prophylaxis in some settings might reduce their risk of this highly morbid condition.

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REFERENCES

- 1 Branum AM, Jones J. Trends in long-acting reversible contraception use among U.S. women aged 15–44. *NCHS Data Brief* 2015;1–8.
- 2 Cobbs CG. IUD and endocarditis. *Ann Intern Med* 1973;78:451.
- 3 de Swiet M, Ramsay ID, Rees GM. Bacterial endocarditis after insertion of intrauterine contraceptive device. *Br Med J* 1975;3:76–7.
- 4 Rampersaud R, Randis TM, Ratner AJ. Microbiota of the upper and lower genital tract. *Semin Fetal Neonatal Med* 2012;17:51–7.
- 5 Murray S, Hickey JB, Houang E. Significant bacteremia associated with replacement of intrauterine contraceptive device. *Am J Obstet Gynecol* 1987;156:698–700.
- 6 Suri V, Aggarwal N, Kaur R, et al. Safety of intrauterine contraceptive device (copper T 200 B) in women with cardiac disease. *Contraception* 2008;78:315–8.
- 7 Vu Q, Micks E, McCoy E, et al. Efficacy and safety of long-acting reversible contraception in women with cardiovascular conditions. *Am J Cardiol* 2016;117:302–4.
- 8 Baddour LM, Wilson WR, Bayer AS, et al. Infective endocarditis in adults: diagnosis, antimicrobial therapy, and management of complications: a scientific statement for healthcare professionals from the American Heart Association. *Circulation* 2015;132:1435–86.
- 9 Habib G, Lancellotti P, Antunes MJ, 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;36:3075–128.
- 10 Wilson W, Taubert KA, Gewitz M, et al. Prevention of infective endocarditis: guidelines from the American Heart Association: a guideline from the American Heart Association Rheumatic Fever, Endocarditis, and Kawasaki Disease Committee, Council on Cardiovascular Disease in the Young, and the Council on Clinical Cardiology, Council on Cardiovascular Surgery and Anesthesia, and the Quality of Care and Outcomes Research Interdisciplinary Working Group. *Circulation* 2007;116:1736–54.

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