

## References

- [1] Andrade F, Shukla A, Bureau C, Senzolo M, D'Alteroche L, Heurgue A, et al. Pregnancy in idiopathic non-cirrhotic portal hypertension: a multicentric study on maternal and foetal management and outcome. *J Hepatol* 2018;69:1242–1249.
- [2] Corey EK, Harvey SA, Sauvage LM, Bohrer JC. A case of ruptured splenic artery aneurysm in pregnancy. *Case Rep Obstet Gynecol* 2014;2014:793735.
- [3] Sadat U, Dar O, Walsh S, Varty K. Splenic artery aneurysms in pregnancy—a systematic review. *Int J Surg* 2008;6:261–265.
- [4] Samame J, Kaul A, Garza U, Echeverria A, Galvani C. Laparoscopic aneurysm resection and splenectomy for splenic artery aneurysm in the third trimester of pregnancy. *Surg Endosc* 2013;27:2988–2991.
- [5] Hillemanns P, Knitza R, Muller-Hocker J. Rupture of splenic artery aneurysm in a pregnant patient with portal hypertension. *Am J Obstet Gynecol* 1996;174:1665–1666.
- [6] Abbas MA, Stone WM, Fowl RJ, Gloviczki P, Oldenburg WA, Pairolero PC, et al. Splenic artery aneurysms: two decades experience at Mayo clinic. *Ann Vasc Surg* 2002;16:442–449.
- [7] Heller MT, Tublin ME, Hosseinzadeh K, Fargiano A. Imaging of hepatobiliary disorders complicating pregnancy. *AJR Am J Roentgenol* 2011;197:W528–536.
- [8] Ray JG, Vermeulen MJ, Bharatha A, Montanera WJ, Park AL. Association between MRI exposure during pregnancy and foetal and childhood outcomes. *JAMA* 2016;316:952–961.
- [9] Selo-Ojeme DO, Welch CC. Review: spontaneous rupture of splenic artery aneurysm in pregnancy. *Eur J Obstet Gynecol Reprod Biol* 2003;109:124–127.
- [10] Parrish J, Maxwell C, Beecroft JR. Splenic artery aneurysm in pregnancy. *J Obstet Gynaecol Can* 2015;37:816–818.

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## Reply to: “Splenic artery aneurysms, portal hypertension and pregnancy”

To the Editor:

We thank Dr Adam Morton for his interest and comments on our study.<sup>1,2</sup> In his letter, Dr Morton elaborates on the importance of diagnosing and managing splenic artery aneurysm in women of childbearing age with idiopathic non-cirrhotic portal hypertension. The author rightly points to the risk of rupture of splenic artery aneurysm during pregnancy in these patients, with the associated risk of maternal and foetal mortality.

Following this comment, we reviewed the charts of all women included in our study. An abdominal imaging procedure was performed in all women 4 (0–27) (median, range) months after delivery. Only 1 woman had a splenic artery aneurysm of 16 mm in the largest axis (patient 7). This patient had 3 pregnancies. Splenic artery aneurysm was diagnosed after the first pregnancy and remained stable over the 51 months of follow-up, which included 2 pregnancies.

While the prevalence of splenic artery aneurysm in patients with cirrhosis and portal hypertension ranges from 7% to 20%, this prevalence in patients with idiopathic non-cirrhotic portal hypertension is unknown with only few cases reported so far.<sup>3–10</sup>

In conclusion, we agree with Dr Morton that splenic artery aneurysm screening should be added to the list of items to be checked prior to pregnancy in women with idiopathic non-cirrhotic portal hypertension. The size of aneurysm justifying prophylactic treatment however remains to be determined.

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### Conflict of interest

The authors declare no conflicts of interest that pertain to this work.

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### Authors' contributions

F.A., and P-E.R. wrote the paper. All authors collected the clinical data, discussed and critically revised the manuscript.

### Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.jhep.2019.01.006>.

### References

- [1] Andrade F, Shukla A, Bureau C, Senzolo M, D'Alteroche L, Heurgué A, et al. Pregnancy in idiopathic non-cirrhotic portal hypertension: a multicentric study on maternal and fetal management and outcome. *J Hepatol* 2018;69(6):1242–1249.
- [2] Morton A. Splenic artery aneurysms, portal hypertension and pregnancy. *J Hepatol* 2019;70(5):1026–1027.
- [3] Robertson AJ, Rela M, Karani J, Heaton ND. Splenic artery aneurysm and orthotopic liver transplantation. *Transpl Int* 1999;12(1):68–70.
- [4] Khan A, Ayub M, Haider I, Humayun M, Shah Z, Ajmal F. Coexisting giant splenic artery and portal vein aneurysms leading to non-cirrhotic portal hypertension: a case report. *J Med Case Rep* 2016;10(1):270.
- [5] Babbs C, Warnes TW, Torrance HB, Ballardie FW. IgA nephropathy in non-cirrhotic portal hypertension. *Gut* 1991;32(2):225–226.
- [6] Chen JS, Chuang SC, Wang SN, Chang WT, Kuo KK, Lee KT, et al. Natural course of splenic artery aneurysm with associated spontaneous splenorenal shunt in non-cirrhotic liver: An 18-year observational follow-up and review of literature. *Kaohsiung J Med Sci* 2013;29(1):55–58.
- [7] Fukushima N, Dohmen K, Yamano Y, Iwakiri R, Nagano M, Iwata Y, et al. Idiopathic portal hypertension associated with intrahepatic portal aneurysm and splenic artery aneurysm—a case report. *Nihon Shokakibyo Gakkai Zasshi* 1991;88(4):1130–1135.
- [8] Tanaka T, Fujimoto Y, Okazaki T, Yano T, Hidaka N, Suzuki S. A case of idiopathic portal hypertension with a splenic arterial aneurysm and severe deposits of iron salts in the spleen. *Nihon Shokakibyo Gakkai Zasshi* 1985;82(5):1402–1405.
- [9] Okumura H, Aramaki T, Sekiyama T, Katsuta Y, Satomura K, Terada H, et al. Idiopathic portal hypertension with extrahepatic portal thrombosis,

potato liver and splenic artery aneurysms—an unusual adult case. *Nihon Shokakibyō Gakkai Zasshi* 1982;79(7):1483–1487.

[10] Pisot V. Case of aneurysm of splenic artery with Banti's syndrome. *Vojnosanit Pregl* 1955;12(1–2):69–71.

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## Prophylaxis of spontaneous bacterial peritonitis: Is there still room for quinolones?

To the Editor:

As members we are really proud of the recently published Association's Clinical Practice Guidelines (CPGs) for the management of patients with decompensated cirrhosis.<sup>1</sup> They offer a precise and careful dissection of the issues encountered during the management of these delicate patients and provide clear and justified indications for treatment.

Especially relevant for us are the indications provided about prophylaxis of spontaneous bacterial peritonitis (SBP). The CPGs suggest that antibiotic prophylaxis should be performed in 3 high-risk patient populations: patients with acute gastrointestinal (GI) haemorrhage, patients with low total protein content in ascitic fluid and no prior history of SBP (primary prophylaxis) and patients with a previous history of SBP (secondary prophylaxis). Whereas ceftriaxone is the antibiotic of choice in those with GI haemorrhage, norfloxacin, a molecule belonging to the class of fluoroquinolone antibiotics, is recommended for both primary and secondary prophylaxis. Norfloxacin administration must be continued until long-lasting improvement of clinical condition and disappearance of ascites in patients undergoing primary prophylaxis whilst is unclear if it can be interrupted in those receiving secondary prophylaxis. It must be noted that the American Association for the Study of Liver Disease (AASLD) Guidelines for the management of adult patients with ascites due to cirrhosis suggest a similar approach. Indeed, patients who have survived an episode of SBP should receive long-term prophylaxis with daily norfloxacin.<sup>2</sup> The rationale behind the administration of fluoroquinolones in cirrhotic patients is to reduce the translocation of gram-negative bacteria from the gut lumen, as these bacteria are responsible for SBP in the

majority of cases. The use of other molecules such as rifaximin, poorly absorbed in the gastrointestinal tract with high intraluminal levels, is a promising alternative but lacks sufficient evidence for use and has not been endorsed by scientific associations.<sup>3</sup>

On the 16th of November the European Medicines Agency (EMA) released a review on quinolone and fluoroquinolone antibiotics, recommending a restriction in these drugs use due to the possible side effects: tendonitis, tendon rupture, arthralgia, pain in extremities, gait disturbance, neuropathies associated with paraesthesia, depression, fatigue, memory impairment, sleep disorders, and impaired hearing, vision, taste and smell.<sup>4</sup> The EMA document was preceded by multiple Food and Drug Administration (FDA) Drug Safety Communications suggesting that fluoroquinolone antibiotics may cause significant decreases in blood sugar and certain mental health side effects (07-10-2018), may lead to side effects involving the tendons, muscles, joints, nerves, and central nervous system (05-12-2016), may cause peripheral neuropathy (08-15-2013) and are associated with an increased risk of developing tendonitis and tendon rupture (Boxed Warning, 07-08-2008). Moreover, mounting evidence suggests an increased incidence of aortic aneurysm or dissection associated with use of oral fluoroquinolones.<sup>5–7</sup>

Uncertainties about fluoroquinolone use are not only limited to side effects, important concerns about bacterial resistance are arising. Based on the latest Annual report of the European Antimicrobial Resistance Surveillance Network (EARS-Net), in Europe 22.8% of *Escherichia coli* isolates and 29.7% of *Klebsiella pneumoniae* isolates were resistant to fluoroquinolones in 2015, with relevant geographical discrepancies.<sup>8</sup> It means that already at beginning of treatment, SBP with quinolones is ineffective in about one-fifth to one-third of patients. Without

Keywords: Spontaneous bacterial peritonitis; Fluoroquinolones; Tendon ruptures; Aortic dissection; Antibiotic resistance.