Reviewer A:

I consider this study can not be novel and unique. Several studies have already report the similar results and conclusion. I've written the comment for the authors as below.

The paper entitled "Evaluation of the diagnostic and prognostic potential of optical coherence tomography of the pulmonary arteries during standardised right heart catheterisation in patients with pulmonary hypertension: A single-centre experience" by Dr. Emilie Zeiger, et al. showed a very useful study in clinical practice.

However, this study is not a novel investigation, and there are several similar studies recently. This is a paper that confirms the clinical usefulness of OCT.

Comment 1A:

In the Methods section, there is no specific description of OCT imaging acquisition, which needs to be added. For example, it is necessary to describe the Fr sizes of sheaths, and what catheters were used for the OCT recording. It is important to describe how the pulmonary vessels are approached.

Reply 1A: Although this is only a retrospective study of OCT images of the pulmonary artery, we agree that specific description of the OCT image acquisition is an important information.

Changes in the text 1A: We added detailed explanation of the OCT image acquisition in the text (Page 8, Line 3).

Comment 2A:

How did the authors inject the low molecular weight dextran for the purpose of blood removal during OCT imaging. The pressure exerted when injecting low molecular weight dextran, etc., will cause the vessel diameter to widen and the wall thickness of the pulmonary artery to thin due to the expansion. In other words, it could be that WT/DM decreases during OCT imaging. It is important to note this phenomenon.

Reply 2A: Thank you very much for this very interesting thought. Indeed, one could suspect a relevant dilatation of the vessel due to contrast injection and therefore disarrangement of the pulmonary arterial wall. However, the technique incl. the amount of contrast we used are according to international standards for OCT within coronary arteries (see also Ziad A et al. and Tearney GJ et al.). Therefore, we think that our results are very well comparable to previous data available on this topic.

(Ziad AA, Keyvan Karimi G, Gary SM, et al. Intracoronary optical coherence tomography: state of the art and future directions. EuroIntervention 2021;17:e105-e23.)

(Tearney GJ, Regar E, Akasaka T, et al. Consensus standards for acquisition, measurement, and reporting of intravascular optical coherence tomography studies: a report from the International Working Group for Intravascular Optical Coherence Tomography Standardization and Validation. J Am Coll Cardiol 2012;59:1058-72.)

Changes in the text 2A: We added some information about that thought in the paper (page 23, line 2).

Comment 3A:

In the Discussion section, the authors mentioned that it is stated that this is one of the first studies using OCT of the PA in children.This is not true. As mentioned earlier, there are many studies that draw similar conclusions. Therefore, the authors need to exclude this sentence.

Reply 3A:

We confirm that there are many studies about OCT of the PA that draw similar conclusions. Although - to our best knowledge – most of them were performed in adult population and studies of OCT in the PA in children are rare.

(Homma Y, Hayabuchi Y, Ono A, Kagami S. Pulmonary Artery Wall Thickness Assessed by Optical Coherence Tomography Correlates With Pulmonary Hemodynamics in Children With Congenital Heart Disease. Official Journal of the Japanese Circulation Society. 2018;82(9):2350-7.)

(Hayabuchi Y, et al. Optical coherence tomography for observing development of pulmonary arterial vasa vasorum after bidirectional cavopulmonary connection in children. PLOS ONE 2019;14(4): e0215146.)

(McGovern E, Voss C, Brunner NW, Duncombe S, Harris KC, Hosking MH. Pulmonary artery wall thickness in children with Fontan physiology: an optical coherence tomography case control study. Cardiology in the young. 2019;29(4):524-7.)

Changes in the text 3A:

We changed the sentence "This is one of the first studies using OCT of the PA in children" to "This is one of the rare studies using OCT of the PA in children".

(See page 20, line 20).

Reviewer B:

Zeiger et al. evaluated the diagnostic and prognostic potential of OCT of pulmonary arteries during standardized right heart catheterization in patients with pulmonary hypertension. OCT parameters correlated with hemodynamics data and risk parameters. This study is interesting; however, some concerns are included.

Comment 1B:

Authors should show the baseline characteristics in Table.

Reply 1B: Baseline characteristics have already been included in Table 2.

Changes in the text 1B:

We added an additional table only for the baseline characteristics (see page 10, Table 1).

Comment 2B:

As the authors described in discussion section, peripheral pulmonary arteries are mainly impaired in patients with PH at early stage. But OCT of this study showed that non-peripheral pulmonary arteries are impaired. What do you think about this point? Are non-peripheral arteries also impaired in PH? Is the PH of the study population severely progressed? What causes do authors think the wall thickness of non-peripheral pulmonary arteries?

Reply 2B: As mentioned by your interesting comment above, first pathologic changes in the pulmonary arterial wall like the intima proliferation appear at the beginning of disease in the small muscular arteries and arterioles and only extend to bigger pulmonary arteries in later stages. Nevertheless, pathologic

changes in PH patients were also shown in hilum near pulmonary arteries and the atheroma was described as the typical alteration in elastic arteries of patients with PH. Muscular arteries range from about 0,100 to 2,000 mm – therefore, with a mean diameter of 2,917 mm, the examined arteries in that study might be located in the middle of the pulmonary arterial tree and therefore represent pulmonary arterial wall changes not only in later stages of PH. As wall-thickness of the PA decreases after birth due to reduction of pressure and blood flow in the pulmonary arteries, remodelling of the non-peripheral pulmonary arteries might be caused by increase in pulmonary vascular resistance for example due elevated blood flow.

(Heath D, Edwards JE. The Pathology of Hypertensive Pulmonary Vascular Disease. Circulation. 1958;18(4 Part 1):533- 47.)

(Heath D, Wood EH, Dushane JW, Edwards JE. The structure of the pulmonary trunk at different ages and in cases of pulmonary hypertension and pulmonary stenosis. The Journal of pathology and bacteriology. 1959;77(2):443-56.)

(Brenner O. Pathology of the vessels of the pulmonary circulation: Part I. Archives of Internal Medicine. 1935;56(2):211-37.)

Changes in the text 2B: We added some changes in the text (page 22, line 15).

Comment 3B:

Authors should show the complications with procedure.

Reply 3B: No patient showed any complications of OCT during right heart catheterization.

Changes in the text 3B: We added some information in the paper (page 8, line 9).

Comment 4B:

Hemodynamics (mPAP and so on) and risk factors were correlated with OCT parameters. This result does not always show the prognosis of PH. Authors should reconsider the title of

The paper.

Reply 4B: Thank you for that important comment. Referring to the recommendations of the World Symposium on Pulmonary Hypertension 2019, determinants of risk in paediatric pulmonary hypertension include among other parameters CI and mPAP/mSAP. We agree that risk assessment in paediatric patients with PH is not based only on one parameter and that many parameters have to be taken into account. Although, significant correlation of OCT parameters with some of the hemodynamic factors and risk factors shows potential of OCT as additional parameter for the assessment of prognosis in children with PH. It might be true that there is limited evidence that OCT parameters correlate with haemodynamic parameters and risk factors in patients with PH. However, OCT parameters could potentially contribute to prognosis and risk assessment in patients with PH in the future, but we agree that therefore further evidence is needed. Therefore, we found the title appropriate as we indicated that this is an evaluation of the prognostic potential of OCT in the PA.

Changes in the text 4B: -

Comment 5B:

IVUS are used for evaluating the vessels. Is the OCT superior to IVUS? Author should discuss the differences between OCT and IVUS.

Reply 5B: Compared to IVUS which uses sound for image acquisition, OCT uses a light wave. Therefore,

OCT enables a higher image resolution of 10-20 µm – compared to a resolution of 100 to 200 µm of IVUS. Higher resolution and quality of OCT images compared to IVUS has been shown and discussed.
Changes in the text 5B: We added information about image resolution of OCT compared to IVUS (see page 4, line 16).

Zeiger et al. evaluated the diagnostic and prognostic potential of OCT of pulmonary arteries during standardized right heart catheterization in patients with pulmonary hypertension. Impaired peripheral pulmonary arteires are main cause of PH. OCT can not observe the peripheral pulmonary arteries. So I ask the authors to discuss this points. And I asked atuhors to change title and to add the Tables.