Author’s response to reviews

Title: Diagnostic accuracy of multi-slice computed tomography in Children with Abernethy malformation

Authors:

Chen Guo (guochen0028@163.com)
Yumin Zhong (zyumin2002@163.com)
Qian Wang (wangqian@scmc.com.cn)
Liwei Hu (huliwei@scmc.com.cn)
Xiaohong Gu (guxiaohong@scmc.com.cn)
Hong Shao (shaohong@scmc.com.cn)
Wei Wu (wuwei@scmc.com.cn)
Jianfeng Cao (caojianfeng@scmc.com.cn)
Haisheng Qiu (qiuhaiqiu@scmc.com.cn)

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Diagnostic accuracy of multi-slice computed tomography in Children with Abernethy malformation

Chen Guo; Yumin Zhong; Qian Wang; Liwei Hu; Xiaohong Gu; Hong Shao; Wei Wu; Jianfeng Cao; Haisheng Qiu

Dear Editor:

Thank you very much for giving us an opportunity for revising our paper. We have considered the comments carefully from you and the reviewers and we have done our best to modify our manuscript. We are looking forward to your favorable decision.
Editor Comments:

-Please respond to comments of each reviewer

Answer: Thank you very much for your review and reminder. We will carefully read and respond to each reviewer’s comments.


Answer: Thank you for your advice. We recorded the radiation dose of CT examination in 14 cases (DLP, CTDI, ED). We calculated the mean DLP, CTDI and ED, and then added the results to “Result” section.

In the “Discussion” section, we also joined the discussion on the dose of CT examination for children, and cited the literature you recommended.

-Discus about merits and limitation of CTA and MRA using these ref

Answer: Thank you for your recommendation. We discussed the advantages and disadvantages of CTA and MRA with your recommended literature, and discussed the side effects of sedation in children.

Reviewer reports:

Sunil Adhikari, M.D. (Reviewer 1): Please include all comments for the authors in this box rather than uploading your report as an attachment. Please only upload as attachments annotated versions of manuscripts, graphs, supporting materials or other aspects of your report which cannot be included in a text format.

Please overwrite this text when adding your comments to the authors.

Answer: Thank you very much for your review and reminder. We will carefully refer to the comments of each reviewer and make appropriate replies and revisions.
Zhaojun Li, Ph.D., M.D. (Reviewer 2): Abemethy malformation is a very rare congenital abnormality. In this study, 14 cases were described. This manuscript is written as a case series, not a research article.

1. Abstract: The background should include brief background and aim of study. In addition, the abstract provides key and important information, so the abstract need to be refined.

Answer: Thank you very much for your advice on the abstract. We added some background information to the “Background” section of abstract and made some modifications in other parts.

2. Methods: The statistical method may be incorrect because the statistical description does not match the result.

Answer: Our sample size is small, so we do not use complex statistical methods. The same two radiologists confirmed CT diagnosis based on the CT findings separately, but their diagnosis was the same (We supplement this conclusion in the “Results-MSCT findings”). Five children with Abernethy malformation type Ib and nine children with type II were identified by MSCT. Compared with DSA and surgical results, two cases of type II Abernethy malformation were misdiagnosed as type Ib Abernethy malformation in MSCT. The accuracy rate of this method was 85.7% (12/14).

3. Results: Why the results of MSCT were not compared with surgery, but with DSA?

Answer: DSA is the gold standard for the diagnosis of Abernethy malformation. DSA can accurately classify Abernethy malformations, because this examination can exactly show whether there are portal vein branches in the liver, which is the most important criterion for distinguishing Abernethy malformations. In some cases, Abernethy malformations can be occluded under DSA without other surgical treatment. For patients undergoing surgery, the purpose of surgery is to occlude the abnormal shunt, rather than to observe the intrahepatic portal vein branches.

4. Discussion: The complications of Abemethy malformation were described tediously, but the discussion on CT is too simple.

Answer: We quite agree with your suggestions in this regard. Therefore, we have added more discussions about CT in the discussion section, including dose, image quality, advantages and disadvantages of CTA and MRA, in order to enrich the discussion part.
References are as follow:


5. Suggest to submit this manuscript as "case series".

Answer: Abernethy malformation is a very rare congenital abnormality. Over the past seven years, we have collected 14 cases of Abernethy malformation (all underwent enhanced CT and DSA). There is no denying that our sample size is very small. As we mentioned in the previous comment, we have tried to enrich the discussion on CT diagnosis of Abernethy malformation, to explore the diagnostic significance of CT as a non-invasive imaging examination for the disease, and to make it closer to a research article. Thanks again for your advice on this article.

Kyung Won Kim (Reviewer 3): This is a kind of case series of 14 patients with Abernethy malformation, mainly focusing on CT findings. In clinical practice, the diagnosis of this very rare disease entity largely relies on CT findings, even though interventional angiography is regarded as gold standard.

Regarding the originality, this paper aimed to demonstrate manifestations of CT and its diagnostic accuracy for diagnosis of the Abernethy malformation when comparing to the interventional angiography. However, the Abernethy malformation is a well-known anomaly and there have been several preexisting papers for the anatomic information and CT findings.

As to the methodology, this paper has simple and straightforward method. It provided clinical information, CT findings, DSA findings, and treatment. However, there is no information of
treatment outcome. If authors provide the treatment outcome, the value of this paper will be much increased. In addition, the diagnostic accuracy was $85.7\%$ (12/14), and the reason of misdiagnosis on CT was failure to visualize the extremely hypoplastic portal veins distal to the shunt with CT angiography. However, due to small sample size, it might be difficult to confirm this diagnostic accuracy.

The style and grammar of this paper should be checked throughout the manuscript.

Answer: Thank you very much for your further advice on the outcome of the treatment. We have followed up the cases after treatment. Of the eleven cases treated, eight cases were followed up after treatment. We recorded the serum ammonia level, the development of intrahepatic portal vein and other clinical features of the eight cases, and added these information to the “Results-Surgical” section.

As for the diagnostic accuracy, this is indeed a limitation of our research. Abernethy malformation is a rare congenital abnormality, and the published literature is often based on case reports. Over the past seven years, we have collected 14 cases of Abernethy malformation (all underwent enhanced CT and DSA). In this study, we can only truthfully express our findings, hoping to achieve a larger sample size by further collecting cases in the future.

Takahito Nakajima, M.D., Ph.D (Reviewer 4): The authors demonstrated manifestations of multi-slice computed tomography (MSCT) in Abernethy malformation and its diagnostic accuracy. Although the sample size was small, cases with Abernethy malformation were well described. However, some important discussions for MSCT of children were not introduced in this manuscript.

Major issues:

#1 Some discussions or descriptions are required about MSCT for children.
The effect of heart rate and respiration should be considered for CT in children. High heart rates might affect the quality of CT images. The frequency of respiration is another important factor. The authors should describe the condition of CT acquisition, for example, with or without general anesthesia or any sedative treatments. Please discuss the difference of image quality between the two different CT scanners.

Answer: Thank you very much for your advice. However, we are sorry that we didn't record the heart rate and respiratory rate of patients during CT examination, so we can't analyze the effect of heart rate and respiratory rate on image quality.

In “Methods” section, we described the CT parameters and the presence or absence of sedation.

In “Discussion” section, we discussed the possible side effects of sedation in children, and looked forward to the possibility of children completing CT examination without sedation in the future supported by technology.
References are as follow:


#2 Discrepancy of the classification of Abernethy malformation between MSCT and DSA
In Table 2, two cases were classified as type Ib by MSCT and as type II by DSA. This discrepancy might be a weak point of MSCT. Please discuss this point.

#3 Advantage of DSA
The main advantage of DSA would be that it can show the hemodynamics of portal flow in patients with Abernethy malformation. Please discuss this point in the manuscript.

Answer: We can answer the issue 2 and 3 at the same time. Because of portosystemic shunt, the pressure of intrahepatic portal vein is higher than that of systemic vein. Contrast agents are more likely to enter the systemic vein through communicating branches. During DSA examination, after balloon occlusion, the contrast agents failed to enter the systemic vein, which increased the pressure of the small portal vein branches in the liver. Therefore, DSA images can show small portal vein branches in the liver which not able to be shown in CT images.

References are as follow: