

# ERAS & Tubeless—Michael Haddock: the past and future of proton beam

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## Introduction

Dr. Michael Haddock (*Figure 1*) is an Associate Professor of Oncology, Mayo Clinic College of Medicine and is a consultant and chair of the clinical practice committee in the Department of Radiation Oncology. He is currently serving as a Vice Chair of the American College of Surgeons Oncology Group (ACOSOG) gastrointestinal and sarcoma committee and is the Mayo Clinic Principle Investigator for the Radiation Therapy Oncology Group.

Dr. Haddock's research interests involve integration of radiation therapy with chemotherapy in the management of gastrointestinal malignancies and the use of intraoperative radiation therapy (IORT) in the management of locally advanced gastrointestinal and gynecological malignancies.

He is the principle investigator of IRB 106-02, IORT database, which contains treatment and follow-up data on more than 1,900 patients in whom IORT has been a component of treatment. Research through the North Central Cancer Treatment Group has included evaluation of new systemic regimens in combination with radiation therapy for pancreatic cancer.

Dr. Haddock has more than 100 publications in several journals such as *Journal of Clinical Oncology*, *JAMA* and *Annals of Surgery*. Ongoing interests include investigation of preoperative combined modality therapy prior to orthotopic liver transplant for cholangiocarcinoma and evaluation of bowel function following pelvic radiation therapy.

The First Chinese ERAS & Tubeless Multidisciplinary Forum was held in Guangzhou on 8–10 September 2017. During the forum, AME Publishing Company had the honor of inviting Dr. Michael Haddock, consultant and chair of the clinical practice committee in the Department of Radiation Oncology of Mayo Clinic, Vice Chair of the American College of Surgeons Oncology Group (ACOSOG) gastrointestinal and sarcoma committee to an interview (*Figure 2*).

In his interview with us, Dr. Haddock talked about



**Figure 1** Michael Haddock.



**Figure 2** Dr. Michael Haddock in the First Chinese ERAS & Tubeless Multidisciplinary Forum.

proton therapy: the use of a heavy-charged particle and by taking advantage of its physical characteristics, to reduce the dose to normal tissues. This means that the patients

who receive proton therapy will not damage their other organs, and proton might be even better than conventional radiotherapy when it comes to working with other treatment methods, such as immunotherapy. While there remains a challenge of having to prove the advantages of proton therapy at this current stage, studies looking into comparative effectiveness and the reduction of secondary cancers are underway. Dr. Haddock expressed his hopes for proton therapy, and believed that if its access were to expand, it would certainly alter the way cancer patients are treated.

## Interview

**AME:** *During your talk, you mentioned Mayo Clinic's proton beam program. Could you briefly introduce it to us?*

**Dr. Haddock:** Proton beam therapy is the use of a heavy-charged particle and by taking advantage of its physical characteristics, to reduce the dose to normal tissues. We have built two facilities, one in Minnesota and one in Arizona, that are currently running in full operation, and have the capacity to treat about 2,000 patients a year in each facility.

**AME:** *Right now, proton therapy equipment is expensive and is only made available to a small number of patients in certain parts of the world. How should we make it more accessible to the public?*

**Dr. Haddock:** That is one of the challenging factors; it is expensive to build one of these facilities. The long-term cost and cost differential is not that high as the facility can be used for about 30 years with the same accelerator, but in order to be more widely accessible, technology needs to be less expensive, and that will happen over time as more facilities are built. There is currently a large proliferation of centers; there are a number in Asia, a number in China, and Japan has a very large number of charged particle facilities.

**AME:** *Would there be any possibility of proton therapy replacing conventional radiotherapy for good in the future?*

**Dr. Haddock:** It is possible; there are some cancers where there is no advantage to using the proton, so there will probably still be a role for the convention radiation in treating some cancers, for example the palliation of pain, or it's not very important what the dose is because the patient's lifespan is not expected to be long. But it could replace a

significant number of patient treatments if the access were greatly expanded.

**AME:** *What is the advantage of proton therapy compared to conventional radiotherapy?*

**Dr. Haddock:** Part of the challenge is that it takes quite a bit of time to collect the data, and one of the greatest promises of proton therapy is that in theory, there should be a reduction in secondary cancers, which usually happen 10 years or more after radiation, but that would take quite a long time to determine or to show it in a way that is convincing, and while in theory it should be true, it takes many years to collect the data.

**AME:** *What are your thoughts on combining proton therapy and other treatment methods such as immunotherapy or targeted drugs?*

**Dr. Haddock:** One of the interesting things in oncology is that some of the best results with almost any cancer happen with combined treatments. There has been a great interest right now in combining radiotherapy with immunotherapy, and in some cases, radiotherapy is used to augment the effects of immunotherapy. One of the advantages of proton therapy is that you can avoid treating as much of the bone marrow, so that you don't have an immunosuppressive effect, which is something you might have from the conventional radiation. So, in terms of combining with immunotherapy, proton should actually be better than conventional X-rays.

**AME:** *What would you say are some research topics of huge attention currently in the field of radiation oncology?*

**Dr. Haddock:** The main research topics are showing comparative effectiveness studies for a variety of cancers, and there are a number of studies currently ongoing in an attempt to show, scientifically, that the results are better for esophagus, lung, breast cancer, and it takes time to complete those studies, but that's what the current research is focused on. There are a number of studies looking at being able to more carefully select the right patients to reduce the overall treatment time, reduce the number of treatments and make the treatment more effective and less time-consuming for the patients. This can be done with proton, because of the reduced dose to normal tissues, you can sometimes shorten the overall treatment and give the radiation dose in a

shorter period of time and still have it be tolerable.

*AME: How has proton therapy advanced in the last two decades?*

**Dr. Haddock:** There were a couple of facilities developed in the United States many years ago, but they started as very simple facilities, and the technology that's advanced now has enabled more sophisticated radiation delivery systems, such as using a synchrotron to use a pencil beam scan instead of a passive scatter system that shoots the radiation over a broader area, so that's been a major technological advance. Associated with that, there's been a rapid proliferation of proton facilities throughout the world, in Europe, in the United States, and in Asia.

*AME: When using proton therapy, what makes you excited?*

**Dr. Haddock:** One of my specialties is gastrointestinal cancer, so, for example in esophageal cancer, the most exciting thing is telling the patient that we won't have to damage their heart or their lungs and significantly decrease their risk of having heart or lung problems after they go

through the radiation and surgery.

*AME: Lastly, please share with us your thoughts on the future of proton beam therapy.*

**Dr. Haddock:** Well, I think the future is going to really be determined by the comparative outcome studies. I think the future will also be dependent on the economics and whether or not the price can be reduced to make it available to more people, but I think it is going to be the way that most patients are treated with curative attempt at some point in the future.

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### Footnote

*Conflicts of Interest:* The authors have no conflicts of interest to declare.

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