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Intracerebral Hemorrhage Journal Club

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Case Presentation

A young faculty member in an Emergency Medicine residency program has recently seen a patient with an intracerebral hemorrhage. The resident with whom he managed this patient had many questions regarding the ED diagnosis and management of the patient's condition. Issues related to BP management and ICP management were discussed, as well as whether or not specific guidelines regarding the acute management of ICH patients exist. As always, this faculty member wants to be knowledgeable regarding ICH etiologies and the pathophysiology of this condition and how it relates to the acute management.

In doing a search on the diagnosis and management of ICH, this attending physician finds one guideline on ICH, and notes several articles on the use of recombinant factor VIIa. These articles raise several questions:

What is the pathophysiology of ICH?

How are ICH patients optimally diagnosed and treated in the ED?

What is the role of recombinant factor VIIa in the ED treatment of ICH?

What future research will improve the ED treatment of ICH patients?

Relevant ICH Articles with Annotation

Volume of intracerebral hemorrhage. A powerful and easy-to-use predictor of 30-day mortality.

Broderick JP, Brott TG, Duldner JE, Tomsick T, Huster G.
1993 Stroke

http://stroke.ahajournals.org/cgi/content/abstract/24/7/987

This retrospective study reviewed the records of 188 ICH patients to determine predictors of 30 day mortality. Hemorrhage volume and initial GCS score could be used to accurately predict mortality in these ICH patients.

With ICH bleeding volumes > 60 cm3 and a GCS < 9, the mortality was 91%. Conversely, when the volume was < 30 cm3 and a GCS > 8, the mortality was only 19%.

Early hemorrhage growth in patients with intracerebral hemorrhage.

Brott T, Broderick J, Kothari R, Barsan W, Tomsick T, Sauerbeck L, Spilker J, Duldner J, Khoury J.
1997 Stroke

http://stroke.ahajournals.org/cgi/content/full/28/1/1

This study prospectively examined 142 ICH patients using CT scanning at time zero and again at 1 and 20 hours. The study purpose was to determine if ICH hemorrhage volume increased over time, and whether not this change in volume could be correlated with clinical deterioration.

In a total of 103 patients with these scans, 26% had a growth in volume > 33% by 1 hour, and 38 % had a similar growth by 20 hours. In patients in whom this volume growth was observed, there was a significantly greater decrease in NIHSS and a greater likelihood that there would be a > 2 drop in GCS.

Guidelines for the management of spontaneous intracerebral hemorrhage: A statement for healthcare professionals from a special writing group of the Stroke Council, American Heart Association.

Broderick JP, Adams HP Jr, Barsan W, Feinberg W, Feldmann E, Grotta J, Kase C, Krieger D, Mayberg M, Tilley B, Zabramski JM, Zuccarello M.
1999 Stroke

http://stroke.ahajournals.org/cgi/reprint/30/4/905

Although nearly 6 years old, this guideline still is an excellent source of information regarding the initial presentation, diagnosis, and treatment of ICH patients. It covers important topics such as BP management, ICP management, and the need for operative intervention. It includes 95 references, and is a must read if you would like to fully understand the acute management of ICH patients.

Recombinant factor VIIa for rapid reversal of warfarin anticoagulation in acute intracranial hemorrhage.

Freeman WD, Brott TG, Barrett KM, Castillo PR, Deen HG Jr, Czervionke LF, Meschia JF.
2004 Mayo Clinic Proc

http://www.mayoclinicproceedings.com/Abstract.asp?AID=775&Abst=Abstract&UID=

This small case series describes the use of factor VIIa in ICH patients whose hemorrhage is related to warfarin use. Following the administration of 62 micorgrams/kg of factor VIIa and other blood therapies, the mean INR decreased from 2.7 to 1.1 units. This data suggests that this therapy might be considered in ICH patients with an abnormal INR.

Early surgery versus initial conservative treatment in patients with spontaneous supratentorial intracerebral haematomas in the International Surgical Trial in Intracerebral Haemorrhage (STICH): a randomised trial.

Mendelow AD, Gregson BA, Fernandes HM, Murray GD, Teasdale GM, Hope DT, Karimi A, Shaw MD, Barer DH; STICH investigators.
2005 Lancet

http://www.thelancet.com/journal/vol365/iss9457/abs/llan.365.9457.analysis_and_interpretation.32126.1

This randomized study of 1033 patients outside of the US compared ICH patient outcomes with medical management and those with operative intervention within 24 hours. The clinical endpoint was a favorable neurological outcome at 6 months.

In both patient groups, approximately 25% had a favorable outcome, regardless of whether early surgical intervention augmented medical management. This data suggests that optimizing early ED management will be essential, especially if early surgical intervention is less often utilized for these patients.

Safety and feasibility of recombinant factor VIIa for acute intracerebral hemorrhage.

Mayer SA, Brun NC, Broderick J, Davis S, Diringer MN, Skolnick BE, Steiner T; Europe/AustralAsia NovoSeven ICH Trial Investigators.
2005 Stroke

http://stroke.ahajournals.org/cgi/content/abstract/36/1/74

This study evaluated the safety of recombinant factor VIIa is the treatment of ICH patients within three hours of presentation. In the 36 patients treated with 6 doses of this therapy, there were no significant safety issues that preclude further studying this therapy in a larger phase III study. This article refers to the study of 400 patients, which is discussed in the following article.

Recombinant activated factor VII for acute intracerebral hemorrhage.

Mayer SA, Brun NC, Begtrup K, Broderick J, Davis S, Diringer MN, Skolnick BE, Steiner T; Recombinant Activated Factor VII Intracerebral Hemorrhage Trial Investigators.
2005 NEJM

http://content.nejm.org/cgi/content/short/352/8/777

This prospective, randomized study of 399 patients evaluated ICH patient outcome when treated with three doses of recombinant factor VIIa when dosed within one hour of the baseline CT scan. The primary outcome measure was ICH volume growth at 24 hours, and 90 outcome was also studied.

Hemorrhage volume growth was decreased in patients treated with factor VIIa, as was mortality and disability at 90 days. Although there were a greater number of serious thromboembolic events in the treated patients, this rate was not statistically significant. This research established the potential role for factor VIIa in the acute management of ICH patients.

Stopping the bleeding in intracerebral hemorrhage.

Brown DL, Morgenstern LB
2005 NEJM

http://content.nejm.org/cgi/content/short/352/8/828

This is an important editorial that provides perspective on the results of the Mayer study. This brief discussion highlights how this study is to be interpreted and what might be learned in future work with this therapeutic agent. It also stresses the need to improve many aspects of the care of these critically ill patients, a concept that is reinforced in the next article.

Priorities for Clinical Research in Intracerebral Hemorrhage. Report From a National Institute of Neurological Disorders and Stroke Workshop.

2005 Stroke

http://stroke.ahajournals.org/cgi/content/abstract/36/3/e23

This lengthy article highlights many of the fundamental questions that must be addressed if the adverse effects of this important disease are to be minimized. Questions that are discussed include those involving ICH pathophysiology and priorities in both the basic science and clinical arenas. The article also addresses critical questions in the areas of imaging, medical management, and the indications for surgical management.

Any emergency physician who reads this article, whether a researcher or a clinician, will know more about the acute management of ICH patients as a result, and so should be able to consider more fully the treatment decisions made in the care of these patients in the Emergency Department.
