

## Review Article

### The Effects of Diabetes Type II in Hypertensive Thalamic Hemorrhage: A Review

Dennis Adjepong, MD, MBA\* 

Department of Neurological Surgery, California Institute of Behavioral Neurosciences & Psychology, Fairfield, USA

#### Abstract

The main aim of the research is to address the effects of diabetes II on a hypertensive thalamic hemorrhage. Its role in intracerebral bleeding has always been controversial, with co-morbidities showing a higher risk of intracerebral hemorrhage. This research hence introduces the topic, explores complications of the disease, then gives an analysis of hypertensive thalamic hemorrhage in relation to diabetes II. The report provides an in-depth analysis of the effects of type II diabetes on hypertensive thalamic hemorrhage, including providing co-morbidities of the disease, clinical examination of the procedures and conclusion in regards to evidence-based practices.

**Keywords:** Diabetes type II; Hypertensive thalamic hemorrhage; Insulin hormones; Intracerebral

#### Introduction

Over the years, epidemiological studies argue that type 2 diabetes and hypertension are much related, commonly having similar symptoms among populations [1]. Studies have shown that hypertensive thalamic hemorrhage affects about 40% of people with diabetes, which is also a significant risk factor of stroke [2]. It has always been a devastating situation, as 30% of individuals with the condition end up losing their life. The risk of death also reached 75% during the first 24 hours, primarily if hemorrhage occurs on the brainstem [3,4]. Individuals aged 55 to 70 years or above are also at high risks, with hemorrhages being destructive as they change the arteries leading to their rupture [5]. Studies have cited risk factors such as hypertension, arteriovenous malformation, vasculopathy, smoking, and hyperlipidemia as the significant causes of hemorrhage occurrences [6,7].

**\*Corresponding author:** Dennis Adjepong, Department of Neurological Surgery, California Institute of Behavioral Neurosciences & Psychology, Fairfield, USA, Tel: +1 5712771998; E-mail: adjepongdennis1@gmail.com

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Current research has aimed at researching the link between the two, given their drastic effects on human health and populations [8]. Type 2 diabetes is associated with certain environmental factors, genetic predispositions, and lifestyle choices [9]. This condition involves the failure of insulin to produce pancreatic beta cells. It may also be a result of the resistance of insulin hormones in the body cells. It is a condition that begins with the body cells' resistance to the body [10]. The resistance interferes with the production of insulin by the beta cells [11]. The resilience and inability of the cells to produce the hormones inhibit their capability to absorb and use glucose in metabolic processes [12]. Thus sugar molecules remain in the bloodstream due to insulin failure in cellular uptake of glucose [13]. Hypertensive Thalamic Hemorrhage is caused by the rupturing of a weakened vessel, which then bleeds into the surrounding parts of the brain [14]. The blood compresses and accumulates in the brain tissue surrounding [15,16]. The two weakened vessels that cause this condition are arteriovenous and aneurysms malformations. These malformations are clusters of blood vessels formed abnormally [5]. The rupture of any of these vessels may cause bleeding into the brain [17].

#### Diabetes Type II Co-morbidities leading to Hypertensive Thalamic Hemorrhage

DM patients with frequent exercise limit the complications of the disease. Exercise has proven to control blood glucose levels significantly and reduces the complications leading to brain hemorrhage. Uncontrolled diabetes may put the patients at a higher risk of both hemorrhagic and ischemic strokes. Individuals with diabetes are likely to display some signs of ischemic stroke [18].

Unfortunately, the mortality rates among patients were 52% in 30 days. Individuals with type 2 diabetes also recorded a higher risk of hypertensive thalamic hemorrhage. Diabetes mellitus occurrences among patients differ, with its prevalence increases with age [12]. Increased correlation between diabetes mellitus and brain hemorrhages has shown a strengthened relationship with Hypertensive Thalamic Hemorrhage. In contrast, some research studies also found completely different results, as they explained that DM reduced the risk of Hypertensive Thalamic Hemorrhage [8]. Again, cerebral vasodilator response among type 2 diabetes patients caused a significant increase in blood pressure, eventually leading to hypertension, including Hypertensive Thalamic Hemorrhage [19].

#### Discussion and Clinical Analysis of the disease

There are several possible mechanisms in which diabetes type 2 may lead to Hypertensive Thalamic Hemorrhage [5]. These mechanisms include systemic inflammation, vascular endothelial dysfunction, thickening of the capillary membrane, and increased early-age arterial stiffness [20]. Diabetes type II usually leads to abnormalities in the left ventricular diastolic filling [21]. Diabetes type II is responsible for mechanisms such as metabolic disorders, hypertension, interstitial fibrosis, and autonomic dysfunction resulting in congestive heart failure [10]. Vascular endothelial function is very vital in the

maintenance of the functional and structural integrity of the blood vessels' walls and the vasomotor control. Nitric Oxide (NO) is responsible for vasodilation; thus, if its reduction may result in endothelial dysfunction. Individuals with diabetes type II have impaired NO-mediated vasodilation [22]. This is a result of increased inactivation of Nitric Oxide. Therefore, Individuals with diabetes type II may have decreased elasticity and stiffer arteries than those with average glucose levels [23]. Tight and stiff arteries are prone to rupturing and bursting. Rupture of these arteries, thus, in turn, causes thalamic hemorrhage.

Uncontrolled diabetes may put the subjects at a higher risk of both hemorrhagic and ischemic strokes. Individuals with diabetes are likely to display some signs of ischemic stroke [18]. For instance, they may have dysarthria and limb weakness showing lacunar infarcts. Diabetes type II is associated with an increase in intracerebral hemorrhage. Intracerebral hemorrhage is fatal as there are no proven treatments to stop the bleeding [24]. An increase in the glucose levels in the blood causes hypertension, which is linked to the rise of hemorrhagic stroke. Researchers show that normalizing the glucose levels may block the plasma kallikrein effect and reduce the diabetic impacts to the brain hemorrhage [25]. Diabetes type II affects the ability of the beta cells to manufacture insulin that controls glucose levels in the blood. People with diabetes, therefore, are likely to record high blood sugar levels [26]. Excess sugars may contribute to the development of fat deposits and clots inside the blood vessel connecting the neck and the brain. This condition is referred to as atherosclerosis [27]. Diabetes type II, therefore, may make it hard for the body to react to hemorrhagic strokes. If the vessel supplying oxygen into the brain is blocked or ruptures, other arteries may play the role [1]. However, in individuals with diabetes, the vessels are hardened with a plaque. As a result, it becomes harder for the blood to reach the brain.

### The unanswered questions

The study used articles between 2000 and 2020 and assumed they are most effective with current information [13]. However, there are still unanswered questions based on the study populations, and participants used to make the deducted conclusions of the studies [28]. More analysis and data on the study populations are considered necessary to make exact conclusions on the role of diabetes mellitus in Hypertensive Thalamic Hemorrhage [29]. The results are also not fully comparable to the arguments made in the articles, as some have divergent opinions. Again, patients proved to have differing occurrences of diabetes mellitus in accordance with Hypertensive Thalamic Hemorrhage [30].

### Conclusion

In conclusion, this study proves that diabetes mellitus occurs as frequent in patients suffering from Hypertensive Thalamic Hemorrhage. Luckily, the conditions are manageable when the DM is reported early. Scholars and medical practitioners believe that diabetes is usually an active modifiable risk for ischemic, among other types of strokes. Again, clinical research estimates that lower blood pressure causes a significant decrease in the risk of cardiovascular diseases, including Hypertensive Thalamic Hemorrhage among patients with type II diabetes. In addition, there is an increased risk of higher mortality rates caused by antihypertensive treatments, especially among patients with hemorrhagic and ischemic stroke. The admission rates proved higher mortality rates among patients hospitalized with

diabetes and ischemic or hemorrhagic stroke. The study also recommends the reduction of obesity, given its high risks associated with both strokes and type II diabetes.

### References

- Saliba W, Barnett-Griness O, Gronich N, Molad J, Naftali J, et al. (2019) Association of Diabetes and Glycated Hemoglobin With the Risk of Intracerebral Hemorrhage: A Population-Based Cohort Study. *Diabetes Care* 42: 682-688.
- Alaigh V, Jang J, Toure T (2019) MON-137 A Case of Diabetic Striatopathy Initially Diagnosed as Intracerebral Hemorrhage. *Journal of the Endocrine Society* 3: 137.
- Hu G, Sarti C, Jousilahti P, Peltonen M, Qiao Q, et al. (2005) The impact of the history of hypertension and type 2 diabetes at baseline on the incidence of stroke and stroke mortality. *Stroke* 36: 2538-2543.
- Irvine HJ, Male S, Robertson J, Bell C, Streib C (2018) Abstract WP340: Primary Intracerebral Hemorrhage and Perihematomal Edema Volumes in Diabetics on Sulfonylureas: A Case-Control Study. *Stroke* 49: 340.
- Mirsan T (2010) Acute treatment of hypertensive intracerebral hemorrhage. *Curr Treat Options Neurol* 12: 504-517.
- Herzig R, Vlachová I, Mareš J, Gabrys M, Šaňák D, et al. (2007) Occurrence of diabetes mellitus in spontaneous intracerebral hemorrhage. *Acta Diabetol* 44: 201-207.
- Hesami O, Kasmaei HD, Matini F, Assarzagdegan F, Mansouri B, et al. (2015) Relationship between intracerebral hemorrhage and diabetes mellitus: A case-control study. *J Clin Diagn Res* 9: 8-10.
- Ergul A, Hafez S, Fouda A, Fagan SC (2016) Impact of comorbidities on acute injury and recovery in preclinical stroke research: Focus on hypertension and diabetes. *Translational stroke research* 7: 248-260.
- Boulanger M, Al-Shahi Salman R, Kerssens J, Wild SH, Scottish Diabetes Research Network Epidemiology Group (2017) Association between diabetes mellitus and incidence of intracerebral hemorrhage and case fatality rates: A retrospective population-based cohort study. *Diabetes Obes Metab* 19: 1193-1197.
- Nomiyama T, Shimono D, Horikawa T, Fujimura Y, Ohsako T, et al. (2018) Efficacy and safety of sodium-glucose cotransporter 2 inhibitor ipragliflozin on glycemic control and cardiovascular parameters in Japanese patients with type 2 diabetes mellitus: Fukuoka Study of Ipragliflozin (FUSION). *Endocrine journal* 65: 859-867.
- Arboix A, Massons J, Garcia-Eroles LU, Oliveres M, Targa C (2000) Diabetes is an independent risk factor for in-hospital mortality from acute spontaneous intracerebral hemorrhage. *Diabetes Care* 23: 1527-1532.
- Zabala A, Darsalia V, Holzmann MJ, Franzén S, Svensson AM, et al. (2020) Risk of first stroke in people with type 2 diabetes and its relation to glycaemic control: A nationwide observational study. *Diabetes Obes Metab* 22: 182-190.
- Shah SD, Kalita J, Misra UK, Mandal SK, Srivastava M (2005) Prognostic predictors of thalamic hemorrhage. *J Clin Neurosci* 12: 559-5561.
- Demchuk AM, Morgenstern LB, Krieger DW, Linda Chi T, Hu W, et al. (2000) Serum glucose level and diabetes predict tissue plasminogen activator-related intracerebral hemorrhage in acute ischemic stroke. *Stroke* 30: 34-39.
- Boulanger M, Poon MT, Wild SH, Al-Shahi Salman R (2016) Association between diabetes mellitus and the occurrence and outcome of intracerebral hemorrhage. *Neurology* 87: 870-878.
- Chen R, Ovbiagele B, Feng W (2016) Diabetes and Stroke: Epidemiology, Pathophysiology, Pharmaceuticals and Outcomes. *Am J Med Sci* 351: 380-386.

17. Ivankovic M, Radman M, Gverovic-Antunica A, Tesanovic S, Trgo G, et al. (2013) Influence of hypertension and type 2 diabetes mellitus on cerebrovascular reactivity in diabetics with retinopathy. *Ann Saudi Med* 33: 130-133.
18. Luo P, Li R, Yu S, Xu T, Yue S, et al. (2017) The relationship between neutrophil-to-lymphocyte ratio and intracerebral hemorrhage in type 2 diabetes mellitus. *J Stroke Cerebrovasc Dis* 26: 930-937.
19. Zhao QJ, Sun M, Zhang XG, Wang LX (2012) Relationship between serum leptin levels and clinical outcomes of hypertensive intracerebral hemorrhage. *Clin Exp Hypertens* 34: 161-164.
20. Koivunen RJ, Satopää J, Meretoja A, Strbian D, Haapaniemi E, et al. (2015) Incidence, risk factors, etiology, severity and short-term outcome of non-traumatic intracerebral hemorrhage in young adults. *Eur J Neurol* 22: 123-132.
21. Verma AK, Maheshwari MC (1986) Hypesthetic-ataxic-hemiparesis in thalamic hemorrhage. *Stroke* 17: 49-51.
22. McGurgan I, Butt S, Silver L, Werring D, Rothwell P (2019) 269 Prevention of hypertensive injury to the brain by intensive treatment in intracerebral haemorrhage (PROHIBIT-ICH): Protocol for a randomised controlled trial of telemetric home BP monitoring. *BMJ* 90.
23. Larsson SC, Wallin A, Håkansson N, Stackelberg O, Bäck M, et al. (2018) Type 1 and type 2 diabetes mellitus and incidence of seven cardiovascular diseases. *Int J Cardiol* 262: 66-70.
24. Ouriel K, Shortell CK, Illig KA, Greenberg RK, Green RM (1999) Intracerebral hemorrhage after carotid endarterectomy: Incidence, contribution to neurologic morbidity, and predictive factors. *J Vasc Surg* 29: 82-89.
25. Law ZK, Sprigg N (2020) Intracerebral hemorrhage in older people. *OXFORD MEDICINE ONLINE* 13: 141.
26. Passero S, Ciacci G, Ulivelli M (2003) The influence of diabetes and hyperglycemia on clinical course after intracerebral hemorrhage. *Neurology* 61: 1351-1356.
27. Tetri S, Juvela S, Saloheimo P, Pyhtinen J, Hillbom M (2009) Hypertension and diabetes as predictors of early death after spontaneous intracerebral hemorrhage. *J Neurosurg* 110: 411-417.
28. Tapia-Pérez JH, Gehring S, Zilke R, Schneider T (2014) Effect of increased glucose levels on short-term outcome in hypertensive spontaneous intracerebral hemorrhage. *Clin Neurol Neurosurg* 118: 37-43.
29. Sarfo FS, Mobula LM, Sarfo-Kantanka O, Adamu S, Plange-Rhule J, et al. (2019) Estimated glomerular filtration rate predicts incident stroke among Ghanaians with diabetes and hypertension. *J Neurol Sci* 396: 140-147.
30. Snarska KK, Bachórzewska Gajewska H, Kapica Topczewska K, Drozdowski W, Chorąży M, et al. (2017) Hyperglycemia and diabetes have different impacts on outcome of ischemic and hemorrhagic stroke. *Arch Med Sci* 13: 100-108.



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