

An Overview on Major Perioperative Cardiovascular Patients with Diabetes

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DESCRIPTION

The prevalence of diabetes continues worldwide. American adults diagnosed with diabetes have been markedly increased by 82.3% since the late 1990s, from 5.1% in 1997 to 9.3% in 2014. Such rapid rising prevalence of diabetes has brought serious consequences for the population health. The major shift has been seen in the leading causes of death in the United States during the past 3 decades. While a precipitous decline in death rates was seen from stroke (63%) and heart disease (52%), a paradoxical increase in death rates was seen from diabetes (45%), particularly among women [1]. The most common form of diabetes mellitus is type 2 diabetes. This disorder affects approximately 90% to 95% of the 14.6 million Americans diagnosed with diabetes and typically occurs later in life [2]. The increasing prevalence of type 2 diabetes is mainly related to the rising prevalence of obesity, the relatively low levels of physical activity and increasing age of the population in the United States. Due to the underlying metabolic defects of insulin production and the frequent co-existence of hypertension and dyslipidemia, type 2 diabetes has long been recognized as an independent risk factor for Cardiovascular Disease (CVD). In fact, CVD becomes virtually ubiquitous among diabetic patients as their age advances and consequently CVD and its complications represent the most common causes of morbidity and mortality in diabetic patients [3]. Thus, it may be appropriate to say, diabetes is a CVD. Both the diabetes epidemic and the population aging have growing importance for the health care system, implying that more services especially surgical cares will be required for the treatment and management of chronic and acute health conditions associated with diabetes. It is estimated that the number of patients eligible for surgery will increase by 25% by 2020 [4], and among the patients with diabetes, more than 50% of them will undergo surgery at some time in their lives. Compared with non-diabetic patients undergoing surgery, diabetic patients are more likely to suffer serious complications perioperatively because many of these patients have severe coexisting diseases such as atherosclerotic disease, peripheral vascular disease and renal disease, and they are highly vulnerable to surgical stress due to the inherent metabolic and neural/hormonal abnormalities.

Among the etiology of surgical complications, Major Adverse Cardiovascular Events (MACE) including cardiac dysfunction/failure, cardiac arrhythmias, Myocardial Infarction (MI), cerebral vascular events, and cardiac arrest represent major and common causes of morbidity and mortality in surgery, especially among ones undergoing major surgery [5]. For example, about 3.9% of patients with risk of cardiac disease underwent non-cardiac surgery experienced perioperative MACE. Nevertheless, clinical strategies to prevent MACE are controversial and uncertain furthermore, few studies have been targeted especially at clinical strategies to prevent MACE in diabetes. Therefore, the data from the clinical trials on diabetes and perioperative medicine gathered in this review are largely from the studies including a significant portion of diabetic patients or sub-group analyses.

Previous studies have well demonstrated that patients with diabetes more frequently have left main Coronary Artery Disease (CAD), generalized/multi vessel atherosclerosis, and diffuse CAD. Also, diabetic patients have a larger amount of lipid-rich plaques or a greater atherosclerotic burden, which manifests itself by evolution of vulnerable plaques, with consequent pre-disposition to rupture and precipitation of Acute Coronary Syndrome (ACS), and probably MACE too. However, despite extensive clinical and basic research, the mechanisms responsible for MACE remain enigmatic in surgical patients in general and become more puzzled in diabetic patients in particular. It is still largely unknown about the role of surgery induced fluctuation of blood glucose, especially acute hyperglycemia in development of MACE, though some studies showed deleterious effects of acute hyperglycemia on endothelial function, thrombosis and inflammatory reaction.

ACKNOWLEDGEMENT

None

CONFLICT OF INTEREST

Author has decline to have conflict of interest

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Received: 20-Jan-2022, Manuscript No. JPME-22-16390; **Editor assigned:** 25-Jan-2022, PreQC No. JPME-22-16390 (PQ); **Reviewed:** 03-Feb-2022, QC No. JPME-22-16390; **Revised:** 10-Mar-2022, Manuscript No. JPME-22-16390 (R); **Published:** 17-Feb-2022, DOI: 10.35248/2684-1290.22.S3.001.

Citation: Beattie SW (2022) An Overview on Major Perioperative Cardiovascular Patients with Diabetes. J Perioper Med. S3:001.

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