

# Care Transitions for People with Coexisting Chronic Heart Failure and Diabetes: Interactions Between the Two Disease Conditions

Angela P. Clark, PhD, RN, ACNS-BC, FAAN, FAHA and  
Heather Cuevas, PhD, RN, ACNS-BC  
The University of Texas at Austin School of Nursing

**Background and Significance:** Chronic heart failure (HF) and diabetes mellitus (DM) are two serious and costly medical conditions needing expert care. Each has been described as a worldwide epidemic—in the U.S. alone, 21 million adults with DM and 5.7 million with HF (Page, 2016). While our specialty systems of care offer expertise, transitions of care between specialty providers can fall short. More awareness of the unique interactions between the two conditions could enhance provider knowledge and potentially improve patient outcomes.

**Purpose:** The purpose of this project is to provide knowledge of key points about unique interactions between the two disease conditions and their management.

## **Discussion:**

- 1) In the U.S. culture of medical specialization, typically a person is treated by two different medical providers—one for diabetes, one for HF. In fact, the ideal treatment strategy for patients with both conditions has been described as controversial (Yancey, 2013). There are still no definite guidelines on either the diagnosis and treatment of heart failure in diabetic patients or on the therapy of diabetes in subjects with heart failure (Kasznicki & Drzewoski, 2014)
- 2) The risk of heart failure increases by 40% in the presence of DM (Gilbert, 2015; Kahn, 2014).
- 3) More women with DM develop HF than men (Pressler, 2016). This gender difference was originally shown in the Framingham data over 40 years ago (Kannel, 1974) and continues presently (Go, 2014; Reginsteiner, 2015; Segheri, 2012).
- 4) Some studies suggest that an increased risk of HF may be associated with specific therapies, such as insulin, sulfonylurea (SU), gliptins or glitazones (Hippisley-Cox, 2016). However, the effects of drugs should be assessed with extreme caution, since diabetic patients often receive multiple therapies simultaneously or over time (Kasznicki & Drzewoski, 2014).

5) The cause of HF in DM is multifactorial in nature but hyperglycemia and insulin resistance appear to be the core factors (Aroor, 2012; Dei Cas, 2015; McMurray, 2014).

6) The absolute contra-indication to metformin use in heart failure was removed by the FDA in 2007 (Aguilar, 2011). Indeed, a systematic review of observational studies including 34,000 patients concluded that metformin should be considered the treatment of choice in patients with diabetes and heart failure (Gilbert, 2015).

7) The 2016 American Diabetes Association standards of medical care recommend avoiding thiazolidinediones in patients with symptomatic HF (ADA, 2016). Recent meta-analyses, which included pivotal randomized, controlled trials, and observational studies strongly suggested that thiazolidinediones exacerbate existing HF and increase the risk for new-onset HF (Home, 2009; NICE, 2000; Scheen, 2010)

8) DPP 4-Inhibitors: A meta-analysis of all randomized trials of vildagliptin, sitagliptin, saxagliptin, alogliptin, linagliptin, and dutogliptin found an elevated overall risk of acute HF in those patients taking any dipeptidyl peptidase-4inhibitor (OR, 1.19; 95% CI, 1.03–1.37), suggesting a possible class effect. The AHA advises that Saxagliptin and Sitagliptin have a “major” magnitude of HF induction or precipitation (Page, 2016).

9) Variances in physiologic stability in either HF or diabetes can potentially affect or cause cognitive impairment (blood glucose out of range in diabetes; decreased cerebral oxygenation + other etiologies in HF) (Clark & McDougall, 2006; Yzeiraj, 2016)

10) A paradoxical relationship between hemoglobin A1c and mortality is well documented but not well understood. Those with low HbA1c levels and those with extremely high levels had a higher mortality. The lowest risk of death was seen in people with modest glucose control (HbA1c 7.1%-7.8%) (Aguilar, 2009; Zhang, 2012).

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**References:** Available on request.

**Follow-up contacts:**

Dr. Clark, [apclark@mail.utexas.edu](mailto:apclark@mail.utexas.edu)

Dr. Cuevas, [hcuevas@mail.utexas.edu](mailto:hcuevas@mail.utexas.edu)