The Guideline Adherence Index as an objective evaluator of appropriate prescribing in heart failure: a meta-analysis

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Abstract

Introduction: Heart failure (HF) prescribing practice may not always reflect the recommendations of international guidelines. Tools have been developed for assessing HF guideline adherence. The Guideline Adherence Index (GAI) is the most frequently used and applied quantitative tool for this purpose.

Aim: To perform a meta-analysis of studies utilising the GAI to assess adherence to prescribing guidelines, the effect of guideline adherence on clinical outcomes and clinical associates of guideline adherence.

Research Design and Methodology: A systematic search of 11 electronic databases (including Medline, Web of Knowledge and Science Direct) was performed with no restriction to language or time in order to identify all quantitative studies reporting the GAI as a tool to measure guideline adherence in HF patients aged ≥18 years only. Assessment of study quality was by the Good ReseArch for Comparative Effectiveness (GRACE) checklist.

Results: Twelve observational studies using GAI were identified. One was excluded due to its poor quality. Therefore, eleven studies were included in the meta-analysis. The original GAI was developed to reflect the 2001 European HF guidelines and subsequent modifications have reflected guideline updates. Patients with HF with preserved ejection fraction were included in seven studies. The GAI considers patient eligibility for the indicated therapy regarding the top three (GAI-3) recommended HF medications. The ranges of GAI-3 were 14%-95%. The rate of achievement of a High GAI-3 (GAI >50%) rose from 38% in 2005 to 71% in 2016. Six studies reported the association between High GAI-3 and patient mortality (overall hazard ratio, HR = 0.29, 95% confidence interval, CI 0.06 - 0.51). Two studies compared the estimated mortality risk between patients with High GAI-3 to those with Low GAI-3 scores (7.7% vs. 16.5% respectively, p-value ≤0.005) and demonstrated lower mortality risk in those with High GAI-3. One-year mortality rates per 100 persons were reported in five studies. Mortality rate was lower for patients with High GAI-3 scores compared to those with Low GAI-3 scores in all five studies. One study estimated the rehospitalisation risk and found that patients with a High GAI-3 score were at significantly reduced risk of rehospitalisation over a 6-month follow-up post-discharge compared to those with Low GAI-3 score (HR = 0.64, 95% CI 0.41 - 1.00). The average rehospitalisation rate per 100 persons was reported in four studies and was consistently lower for those with High GAI-3 score compared to those with Low GAI-3.
GAI-3 scores (22.5% vs. 24.5% respectively). In multivariable analysis, High GAI-3 score was significantly associated with implantation of a cardioverter defibrillator, previous revascularisation, chronic obstructive lung disease, hypertension, dyslipidaemia and ejection fraction ≤30% while Low GAI-3 level was associated with worsening kidney function, lower New York Heart Association class, anaemia and older age.

Conclusion: This is the first meta-analysis of the GAI tool and its clinical implications but it is limited by the observational design of the included studies. No study reported the GAI being used to improve prescribing quality. GAI varies between the different medical settings, however no study has reported a High GAI-3 greater than 71%.

Health Services Research & Pharmacy Practice - HSRPP 2017 University of Nottingham - 2017, April