

# Association Between DBI/ARS Scores and Adverse **Outcomes in Hospitalized Elderly**



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# BACKGROUND

Optimization of drug therapy in the elderly remains a challenge in clinical practice. Drug Burden Index (DBI) and Anticholinergic Risk Scale (ARS) are evidence-based tools used to quantify the severity of exposure that an elderly patient may be at risk of adverse drug reactions caused by drugs with anticholinergic and/or sedative properties.<sup>1,2</sup> Findings from previous studies demonstrated that increased anticholinergic and sedative drug exposure is associated with poorer cognitive and physical function in community-dwelling residents.<sup>1,2</sup> Limited evidence is currently available to determine the significance of using both DBI/ARS scores in hospitalized elderly patients to correlate their relationship with specific inpatient clinical outcomes.

### **OBJECTIVES**

1.To evaluate the utility of DBI/ARS scores in measuring drug therapy quality 2.To assess whether higher total DBI/ARS scores were associated with higher incidence of adverse outcomes in hospitalized elderly patients

### **METHODS**

Design: IRB-approved, retrospective, chart review of electronic medical records

Setting: CAMC-GD, Charleston, WV

#### Outcome Measures:

- Primary endpoint was relationship between total DBI/ARS scores and occurrence of falls, delirium, use of patient safety advocate restraint and (sitter).
- Secondary endpoint was relationship between DBI/ARS scores and length of hospital stay and all-cause mortality.

# STUDY PATIENTS

- Inclusion criteria:
- Patients ≥ 65 years old
- Initially admitted to either a hospitalist (H) or an internal medicine (IM) service
- Between Jan. 1 through Dec. 31, 2010
- Length of hospital stay  $\geq$  4 days

#### Exclusion criteria:

Initial admission to intensive care unit. surgery, or trauma services

#### Patient population:

- Initial number of identifiable patients: 515
- H: 178 vs. IM: 337
- Duplicate patients: 7 (H) vs. 12 (IM)
- Remaining patients: 171 (H) vs. 325 (IM)

 Data collection for IM stopped when reached 171 patients as sample size was determined to be adequate and also to equal 171 (H) patients

### STATISTICAL ANALYSIS

- SAS Program, version 9.2
- Basic descriptive state
- Chi-squared test or
- Outcomes were Whitney U and Kruska
- Statistical significance was determined using an alpha level of  $\leq 0.05$

# **CALCULATIONS**

### Drug Burden Index: 1

- Anticholinergic and/or sedative effects DBI = Total daily dose/ (minimal effective
- dose for geriatrics + total daily dose)
- Example: zolpidem 10 mg at bedtim
- DBI = 10 / (5 + 10) = 0.67

#### Anticholineraic Risk Scale:2

- Categorically ranked list of drugs with mainly anticholinergic effects
- Scale of 0 to 3 (0 = low risk, 3 = high risk)
- ARS = sum of all ARS scores for each drug
- Example: levothyroxine (0), hydroxyzine (3) • ARS = 0 + 3 = 3

# RESULTS

#### Patient Population:

- Baseline demographics (H vs. IM)
  - Age, sex, place of residence (p > 0.05)
  - Cognitive impairment (IM > H, p < 0.0001)

### Outcomes by Groups:

- No statistically significant differences between H vs. IM patients
- Delirium occurred most frequently, followed by use of restraint
- Fall occurred least frequently of all outcomes

#### Table 1. Outcomes and DBI/ARS scores

Outcomes	Median	± SD	p-value	
	Scores			
Delirium	(DBI)		<0.0001	
-Yes	1.63	1.01		
-No	0.67	0.89		
Restraint			0.0013	
-Yes	1.33	1.11		
-No	0.8	0.92		
Delirium	(ARS)		<0.0001	
-Yes	1	1.96		
-No	0	1.15		
Restraint			0.0013	
-Yes	1	2.18		
-No	0	1.25		

## Table 2. Length of Stay and DBI scores

#### = 0.0014

DBI	LOS (days)	LOS (days)	±
Score	Mean	Median	SD
0	7.4	6	4.1
0 – 1	8.0	6	5.3
> 1	9.6	8	6.6

### Table 2. Length of Stay and ARS scores

P = 0.0115

ARS	LOS (days)	LOS (days)	±
Score	Mean	Median	SD
0	8.2	7	5.6
0 – 2	9.0	8	6.3
≥ 3	9.8	9	5.4

# CONCLUSIONS

- Increased DBI/ARS scores associated with -Delirium
  - -Restraint use

-Longer length of hospital stay

- No significant association in the incidence of falls, use of sitter, or all-cause mortality
- DBI and ARS scores are useful in risk stratification of adverse drug outcomes

# REFERENCES

1. Hilmer et al. Drug burden index score and functional decline in older people. Am J Med. 2009;122(12):1142-1149.

2. Rudolph et al. The anticholinergic risk scale and anticholinergic adverse effects in older persons. Arch Intern Med. 2008; 168(5):508-13.

### FINANCIAL DISCLOSURE

None

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•		P =
e	DBI	LOS (days)
	Score	Mean
	0	74

atistics			-No
Fisher's exac	ct test		Delirium
compared u	using	Mann-	-Yes
al-Wallis test			-No