



Heart of the matter: A preliminary analysis of the California Maternal Quality Care Collaborative Cardiovascular Disease Toolkit



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Abstract

Objective: The California Maternal Quality Care Collaborative (CMQCC) recently published a cardiovascular disease (CVD) toolkit for identification of CVD in pregnant/postpartum women. We aim to obtain a baseline screen positive rate and delineate the true positives among women who screened positive.
Study Design: This is a cross-sectional study from a convenience sample of patients presenting for pregnancy care between April 2018 and July 2018 at University of California, Irvine. Subjects were screened at least once, either during pregnancy or postpartum period. Patients screened positive if they exhibited: 'Red Flags', had history of prior CVD, or a combination of moderate risk factors (Figure 1). Patients who screened positive underwent further testing. The primary outcome was the screen positive rate (Table 1). Secondary outcomes were the "true positive" rate and the strength of each of the moderate factors in predicting CVD. Univariate logistic regression was used to analyze data.
Results: 319 women were screened (228 antepartum/intrapartum; 73 postpartum). Only 2.5% of the cohort was African American, 53% was Hispanic, with a large remainder being Caucasian. Overall, 17 (5.3%) patients screened positive and 4 (1.3%) were identified as "true positives" upon further evaluation, i.e. evidence of cardiac disease. Red flags and prior CVD history constituted 9 of 17 screen positive cases; 2 of 4 "true positive" cases were identified from these factors. No patients screened positive by physical exam criteria. Moderate risk factors identified 11 of 17 screen positive cases; 3 of 4 true positives would have been identified based on moderate factors. Table 1 illustrates predictive potential of the moderate factors for a screen positive result.
Conclusions: CVD is the leading cause of maternal mortality¹, and 25% of these are preventable.²⁻⁴ We report preliminary findings of the baseline CVD screen positive rate and the true positive rate in an obstetrical population at a tertiary care center. Additionally, we identified the most relevant moderate factors, which may allow modification of the toolkit. Limitations include small sample size and underrepresentation of African Americans. These data may be utilized to design a larger multicenter investigation to validate the CVD algorithm.

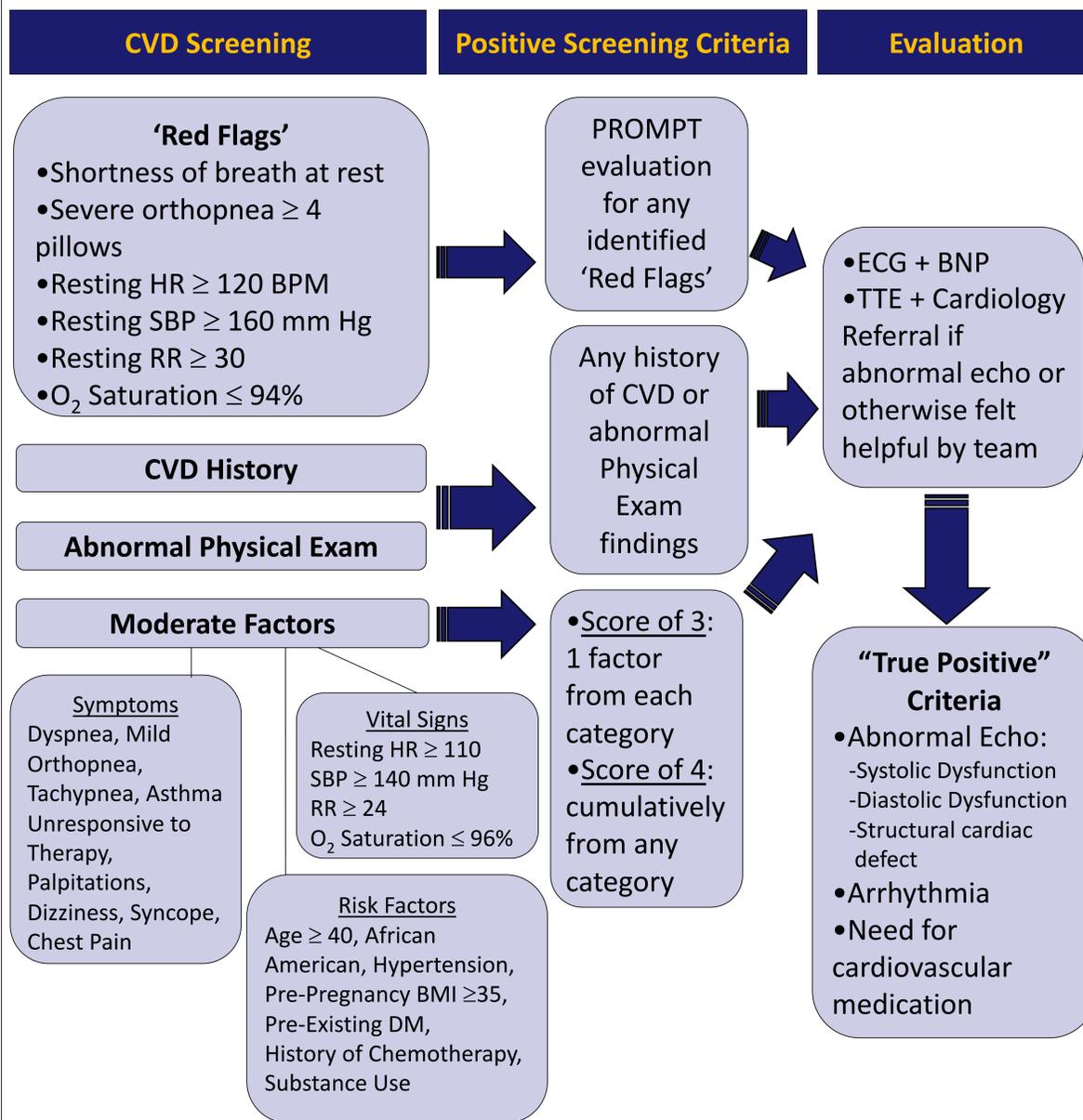
Introduction

- ❖ California Maternal Quality Care Collaborative (CMQCC) published a cardiovascular disease (CVD) toolkit for identification of CVD in pregnant/postpartum women
- ❖ We aim to describe baseline data for the screening algorithm

Study Design

- ❖ Cross-sectional study using CVD Toolkit to screen antepartum and postpartum women (April 2018 - July 2018) at our institution
- ❖ Primary outcome: screen positive rate
- ❖ Secondary outcomes:
 - 'True positive' rate
 - Risk factor prediction for CVD

Figure 1. CVD Screening Algorithm



Results

- ❖ N = 319 women screened (228 antepartum, 73 postpartum)
 - 17 patients (5.3%) screened positive
 - 4 patients (1.3%) "true positives"
- ❖ Red flags & prior CVD history detected 9 of 17 (52%) screen positive cases
 - 2 of 4 "true positive"
- ❖ Moderate risk factors identified 11 of 17 (64%) screen positive cases
 - 3 of 4 "true positives"

Table 1. Risk Factors and Screening Outcomes

Risk Factors	Positive Screen		
	Odds Ratio (95% C.I.)	p-value*	c-statistic
Symptoms			
Chest Pain	40.1 (3.4 – 467.7)	0.003	0.557
Mild Orthopnea	29.5 (8.7 – 100.2)	< .001	0.694
Palpitations	26.9 (7.5 – 96.9)	< 0.001	0.667
Dizziness/Syncope	24.8 (6.3 – 97.1)	< 0.001	0.639
Dyspnea	21.5 (7.3 – 63.7)	< .001	0.74
Tachypnea (Respiratory Rate > 24)	> 999.9 (< 0.01 – 999.9)	NS**	0.529
Asthma Unresponsive to Therapy	< 0.01 (< 0.01 – 999.9)	NS	0.503
Vital Signs			
SBP ≥ 140 mmHg	31.0 (7.4 – 130.5)	< 0.001	0.64
Resting HR ≥ 110 BPM	3.0 (0.6 – 14.3)	NS	0.537
Oxygen Saturation $\leq 96\%$	< 0.001 (< 0.01 – 999.9)	NS	0.508
Respiratory Rate ≥ 24	N/A***	N/A	N/A
Risk Factors			
Pre-Existing Diabetes	17.6 (4.9 – 63.4)	< 0.001	0.635
Chronic Hypertension	9.4 (3.2 – 27.1)	< 0.001	0.671
Pre-Pregnancy Obesity (BMI ≥ 35)	4.3 (1.5 – 12.4)	0.007	0.62
Age ≥ 40	< 0.001 (< 0.01 – 999.9)	NS	0.513
African American	2.3 (0.3 – 19.5)	NS	0.516
Substance Use	1.8 (0.2 – 25.2)	NS	0.513
History of Chemotherapy	< 0.001 (< 0.01 – 999.9)	NS	0.502

Conclusions

- ❖ Initial effort to describe and collect data from the implementation of CMQCC proposed screening algorithm
- ❖ Data will help refine screening tool; limitations included sample size and underrepresented African Americans
- ❖ Future efforts include expansion of study sites for further algorithm assessment and validation study for the algorithm

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