Aortic Dissection and Mortality Associated With Pregnancy in the United States

We read with great interest the recent review by Goldfinger et al. (1) on thoracic aortic aneurysms and dissections. The authors highlight common risk factors associated with aortic dissection. We also strongly support their use of databanks such as IRAD (International Registry of Acute Aortic Dissection) to determine risk factors associated with this uncommon and frequently lethal disease (2). Within the wide spectrum of this condition, aortic dissection during pregnancy represents a particularly unique pathophysiological entity with potentially devastating outcomes for both the mother and her fetus. Reports from IRAD and other large registries have reflected the extremely rare occurrence of aortic dissection during pregnancy, and suggest a putative association reflected in the small case series within the published reports (3,4). To add to our knowledge of contemporary trends in aortic dissection, we utilized the Nationwide Inpatient Sample (NIS), the largest all-payer U.S. inpatient care database, to identify cases of aortic dissection during pregnancy.

Among more than 10 million pregnancies and 41,000 aortic dissections in the NIS database between 1998 and 2008, we identified 44 individual cases of aortic dissection in pregnancy. This represents the largest series to date. The rate of aortic dissection in pregnancy was 0.0004%, and represented 0.1% of all cases of aortic dissection. Interestingly, the proportions of hypertension and eclampsia in this group were 18.2% and 4.5%, respectively. Importantly, only 7 of the 44 cases had Marfan syndrome, with 2 other parturients having other congenital anomalies. Compared with the aortic dissections in the general population, the prevalence of Marfan syndrome was higher and the prevalence of hypertension was lower.

Please note: John A. Elefteriades, MD, served as Guest Editor for this paper.

REFERENCES


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<th>TABLE 1 Aortic Dissection in Pregnancy Compared With the General Population</th>
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<td>Aortic Dissection</td>
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<td>during Pregnancy</td>
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<td>(n = 41,044)</td>
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<tr>
<td>Age, yrs, mean</td>
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<td>Hypertension, %</td>
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<td>Marfan syndrome, %</td>
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Theoretical rendering more patients to be candidates for an aortic repair surgery. Studies by our group and others have shown success in achieving these goals during transfer through use of standardized transfer protocols (3,4).

Transfer of patients to tertiary centers as expeditiously as possible is vital. Establishing time-to-treatment goals has led to markedly improved outcomes in patients with acute myocardial infarction and now serves as a quality benchmark. Similarly, subjects with acute aortic dissection suffer high morbidity and mortality, which is likely affected by time delays in diagnosis and subsequent definitive treatment. Therefore, it is imperative that transfer systems with clear therapeutic targets and benchmarks are established nationwide to improve quality of care in these subjects. We have previously shown successful, safe, and rapid transfer for patients presenting with aortic emergencies and provided time-to-treatment benchmarks for similar transfer systems to emulate and improve upon (5).

In our opinion, a review on thoracic aortic aneurysm and dissection is not complete without emphasis on the importance of initial management of these patients. We believe surgical outcomes can be improved by increased awareness and emphasis on the pre-surgical treatment in this patient population. Creation of protocol-driven aortic networks nationally can be the crucial first step in this direction.

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(Table 1). The low prevalence of Marfan syndrome and hypertension amongst pregnant patients in our study suggests that distinct effects of pregnancy are likely and portend an independent risk for aortic dissection. Histopathological findings within the aortic media confirm loss of normal corrugation of elastic fibers and fragmentation of reticulin fibers in pregnancy (5). We believe these changes occur in response to hormonal shifts during the latter trimesters of pregnancy, representing a unique substrate for aortic dissection. Through the continued use of international registries and multidisciplinary collaboration amongst heart, vascular, and obstetrical teams, we will be able to better define the risks of aortic dissection in pregnancy.

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REFERENCES


REPLY: Therapeutic Goals in Patients With Acute Aortic Dissection

Management Before Surgery

Aortic Dissection and Mortality Associated With Pregnancy in the United States

We thank Dr. Aggarwal and Dr. Raymond for their comments on our paper (1). We agree that patients with aortic dissections often present to hospitals that are not equipped to provide immediate aortic surgery. Pre-operative medical management is important but should not delay transfer for surgery. In IRAD (International Registry of Acute Aortic Dissection), 73% of patients presenting with type A dissection were transferred from nontertiary care facilities, and presentation at a nontertiary care hospital was associated with delayed surgery ($p < 0.001$) (2).

In the IRAD database, the median time from arrival to diagnosis was 4.3 h and from diagnosis to surgery another 4.3 h. Dr. Aggarwal and Dr. Raymond report a median interval of 87 min, but started the clock for transfer to their institution when the aortic transfer team was activated, rather than when the patients presented to the emergency department (3). Of the 263 patients transferred, only 40% (104) had type A dissections (95 had type B dissections, 14 had aneurysms without dissection, 4 had penetrating aortic ulcers, 18 had intramural hematomas, and 28 had no major aortic pathology). The impact of pre-hospital treatment seems modest: a mean 10 mm Hg decrease in blood pressure and a 3 beats per min reduction in heart rate among all transferred patients, not only those with type A dissections.

We commend Dr. Aggarwal and Dr. Raymond for the steps taken at their institution to streamline the transfer of patients with suspected aortic dissection. At the Cleveland Clinic, the transfer of patients directly to the cardiac care unit from 84 regional medical centers is facilitated by an organized aortic network, telephone hotline, and transfer under the watchful eyes of specially trained nurse practitioners and paramedics in contact with cardiovascular intensivists, and by modes of transportation that include ambulances, helicopters, and jet planes. Although few institutions have this infrastructure, and costs can be prohibitive, elements of this program could likely be replicated in other centers.

Dr. Sawlani and colleagues present unpublished results from their examination of data culled from the Nationwide Inpatient Sample (NIS), which includes records from 20% of hospital discharges across the United States. They identified 44 cases of aortic dissection during pregnancy from among 41,044 dissections. This is consistent with the IRAD finding that dissection during pregnancy is rare. In the IRAD database, only 2 of 346 women who had dissections were pregnant. Even patients with Marfan syndrome were more likely to dissect outside of pregnancy than during pregnancy (4).

In the sample from Dr. Sawlani and colleagues, patients who experienced dissection during pregnancy were younger, less likely to be hypertensive, and more likely to have Marfan syndrome than their nonpregnant counterparts. Similarly, in the IRAD