
Discussion

Dr. Tierney: Do you visualize that this material is produced in the amniotic fluid and if that’s the case, how do you look upon the physiologic effect of it?

Dr. Reeves: Well, I think that it comes probably from the lung. We have two experiments with tracheal fluid and it has the same kind of activity. I believe that it may contribute to the high vascular resistance in the fetus.

Dr. Murray: Jack, I’m concerned about the species variation that you mentioned in passing. The fetal circulation of all mammalian species has a high pulmonary vascular resistance and I think the first assumption would be that if there is a ubiquitous mechanism it would be similar among animals.

Dr. Reeves: Well, your concern is, also, our major concern. You would think that if we had touched upon a very important biologic mechanism that it would be active in many species. However, as we learn more about the different species we’re impressed by how they accomplish the same job using different mechanisms.

Platelet Survival Time in Severe Chronic Airway Obstruction*  
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Pulmonary thromboembolism frequently complicates the course of patients with chronic airway obstruction. Platelets play an important role in arterial thrombosis, and in at least some patients with venous thrombosis. This study examines the role of platelets in chronic obstructive airways disease (CAO) by measuring platelet survival time in patients with severe CAO.

Material and Methods

Platelet survival time was measured by labelling the patient’s platelets with 100-150 microcuries of 51chromium and after reinfusion obtaining blood samples at two to three hours and daily for seven days. The platelet button is counted and by computer-assisted least-squares analysis a single exponent is fitted to the count-rate data to obtain the half-time. Normal platelet survival half-time is 3.67 ± .04 days (mean ± SEM; N=18) with a range of 3.3-4.2 days. Student’s t test was used to statistically compare the means.

Platelet survival time was measured in 26 patients with severe CAO. Twenty of these patients had detailed pulmonary function testing to confirm the diagnosis with average vital capacity (VC) 2.52 ± .30 L (56 ± 6.8 percent of predicted), average FEV1.0 = 0.77 ± .11L and average FEV/VC = 31 ± 1.5 percent. The six remaining patients had clinical evidence for far advanced CAO.

Twenty-one patients were hypoxic (PAO2<80 mm Hg) at the time of study and five had normal arterial oxygen tension. Thirteen patients were receiving chronic oxygen therapy at low flow rates and nine of these were hypoxic when studied. Patients were taking a variety of drugs to maximize ventilation including xanthines, sympathomimetic amines and a few were taking prednisone. All were stable in respect to their ventilatory state. Informed consent was obtained.

Results

Mean platelet survival time for these 26 patients with severe CAO was shortened (2.6 ± .13 days). Four patients had normal platelet survival (>3.3 days) and 22 were shortened.

Platelet survival did not correlate with patient age, pulmonary function studies or the presence or absence of cor pulmonale. Of the 21 patients with hypoxemia, 20 had shortened platelet survival and the mean, 2.4 ± .14 days was significantly different from normal (p<0.001) and from the mean of five with severe CAO who had normal arterial oxygen tension (3.0 ± .22 days) (Fig 1).

Of the hypoxic patients, nine were receiving low-flow oxygen and 12 were breathing room air. Mean platelet survival for the 12 non-oxygen-receiving hypoxic patients was 2.3 ± .17 days which was significantly shorter (p<0.01) than the mean of the oxy-

![Figure 1. Mean platelet survival half-time (±SEM) for hypoxic patients with severe chronic obstructive airways disease compared to the mean of those with normal arterial oxygen tension (normoxic).](image-url)
The platelet suppressant drug, sulfinpyrazone, was administered to eight hypoxemic patients with shortened platelet survival. The drug was given for three months at a dosage of 800 mg po per day and platelet survival was remeasured. Three patients received oxygen during the period of sulfinpyrazone therapy. Sulfinpyrazone prolonged platelet survival time in each of these eight patients and normalized platelet survival in one patient. Mean pre-treatment survival was 2.2 ± 0.12 days and was prolonged to 2.9 ± 0.17 days (p < 0.001) by sulfinpyrazone (Fig 2). Arterial blood oxygen tension was not altered during sulfinpyrazone therapy.

**DISCUSSION**

Results suggest that patients with severe CAO have shortened platelet survival time and that shortened platelet survival is associated with hypoxemia. As platelet survival time correlates with a history of thromboembolism in patients with substitute cardiac valves and rheumatic heart disease, platelets may play a critical role in the thrombosis of hypoxemic patients with CAO.

Prolongation of shortened platelet survival time by sulfinpyrazone also supports a role for platelets in thrombosis in CAO. The data comparing hypoxemic patients who are receiving oxygen with hypoxemic patients who are not receiving oxygen suggest that oxygen also alters shortened platelet survival. We have not studied platelet survival before and after initiating oxygen therapy and this should be done. Sulfinpyrazone prolonged platelet survival in 3 hypoxemic patients who were receiving oxygen.

Shortened platelet survival has also been observed in hypoxemic patients with primary pulmonary hypertension and the Eisenmenger syndrome and sulfinpyrazone prolongs shortened platelet survival in these patients. The data suggest that sulfinpyrazone or other platelet suppressant agents might be of benefit in reducing thrombosis in hypoxemic patients with severe CAO.

ACKNOWLEDGMENT: The authors acknowledge the expert technical assistance of Mrs. Gloria Smith, Miss Jean Baughman, and Mrs. Anne Burns and the secretarial assistance of Mrs. Margaret Corbin.

**REFERENCES**


**Discussion**

Dr. Crystal: In these patients with hypoxemia, is there any evidence of other factors involving coagulation?

Dr. Steele: Yes. We've done a number of studies of fibrinogen survival which is, I think, the best way to deal with the participation of the coagulation system. A number of these patients have recurrent venous thrombosis in addition to hypoxemic lung disease.

Dr. Steinberg: Is there any correlation between platelet survival and congestive heart failure?

Dr. Steele: No. Platelet survival time is frequently normal in rather severe congestive heart failure.

Dr. Murray: You've separated your patients into just two groups, those with hypoxia and those without. I would have thought as the first approach you would take all the patients and plot their oxygen saturations against their survival to see if there is a correlation.

Dr. Steele: There isn't any.