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# Thorough epidemiological studies are required to guide further improvements in hemorrhage management

Se requieren estudios epidemiológicos a profundidad a fin de orientar un mejor manejo de la hemorragia

The essay by Rincon-Valenzuela et al<sup>1</sup> raises excellent points concerning the use of fibrinogen in hemorrhage, and not just in obstetric hemorrhage. The cause-effect relationship between bleeding and fibrinogen has not been adequately examined, and the Bradford Hill criteria are all too often forgotten in modern medicine. It could be argued that, although plausibility can be identified for the use of fibrinogen in bleeding, neither an accurate biological gradient nor experimental proof of the relevance of fibrinogen has been adequately demonstrated in different clinical situations. Even temporality is unclearly demonstrated, because we know that fibrinogen levels fall in the postpartum period even in nonbleeding women. Studies in cardiac surgery<sup>2</sup> have, similarly to the Fibrinogen concentrate as initial treatment for PostPartum Haemorrhage trial,<sup>3</sup> failed to produce useful data supporting the routine use of fibrinogen. We would like to suggest several factors that need to be considered in future studies. First, the correlation between fibrinogen levels and functional clotting needs to be more clearly delineated and could be achieved by combining fibrinogen level measurements with thromboelastography in specific patient groups. Secondly, the effect on bleeding by adjusting fibrinogen levels to predefined levels in randomized studies needs to be examined. Only then can the relevance of fibrinogen be confirmed. We think it likely that thromboelastography will come to play a much more significant role in the management of bleeding, allowing an individualized

management of factor substitution. Only then will the use of fibrinogen as a "magic bullet" end and management become more individualized and appropriate.

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