

Commentary

Mesenteric ischemia, high altitude and Hill's criteria

Mesenteric ischemia, fortunately rare, is an emergent condition which catches most clinicians unawares and unprepared because predicting who may succumb to it and who may be spared, is an undaunting clinical task as well as a guessing game. In its chronic form, it is noted for its obscure and cryptic presentation while in its life-threatening acute form it presents with elaborate symptoms of pain accompanied by neither substantial clinical signs nor specific laboratory test results making it a frequently missed diagnosis by the unwary clinician until late in its course. In countries with advanced health systems where telemedicine and air ambulances are at the beckon of practitioners in outlying areas coupled with the ready availability of prompt endovascular options for vasodilation, thrombolysis and stenting the prognosis has been steadily improving, making extensive sacrifice of the gut less and less likely.^[1] In the developing world, however, such luxuries (if available) are reserved for the few fortunate patients with ease of access to tertiary centers where such modalities exist. Thus, it is not surprising that data from these parts of the world show high complication and mortality rates.

The article by al-Shraim *et al.*^[2] in this edition of the journal was aptly described by one reviewer as a *snapshot of a lethal disease* and by another as *essentially a descriptive study* [because] it tells us nothing new and does not identify *knowledge gap* to be filled. With the prominence given to the adjective “high altitude” in the title and its repeated mention in the body

of the article along with the declaration of intent by the authors “to determine the risk factors...of acute occlusive mesenteric ischemia in high-altitude [area] of south-western region of Saudi Arabia,” the reader is primed to expect a connection to be established between high altitude and mesenteric ischemia from their data. That was not done.

A similar observational study from a mountainous region of India concluded that spontaneous intravascular thrombosis was 30 times more common among long-term high altitude dwellers in comparison to those dwelling near sea level.^[3]

Polycythemia, thrombocytosis, pregnancy and cirrhosis of the liver are the recognized contributing factors causing hypercoagulability and a retardation of blood velocity in the pre-hepatic visceral vessels.^[4] It is not surprising, therefore, that the study found a preponderance of mesenteric venous thrombosis (MVT) rather than mesenteric artery thrombosis (MAT) as the most common subtype of acute mesenteric ischemia (AMI) in this locality. It is understandable that the authors want to ascribe such observation to the altitude. To suggest a causative role for high altitude for AMI in this article without conducting a comparative study of the incidence of the disease in another community near sea level is to ignore Hill's criteria of causation. This set of nine criteria (strength, consistency, specificity, temporality, biological gradient, plausibility, coherence, experiment and analogy) sets the rule

for causal relationship between an environmental factor (altitude in this case) and a disease (mesenteric ischemia). The author described them as “different viewpoints from all of which we should study association before we cry causation”.^[5]

The present authors have a duty to take this study a step beyond the findings from previous studies from this region that found significant discrepancies between highlanders and lowlanders in terms of hematocrit,^[6] ischemic stroke,^[7] deep vein thrombosis^[8] and blood pressure^[9] to actually quantifying such differences. Knowing the population of highlanders served by tertiary centers in Abha, Khamis Mushayt, al-Baha and Taif on the one hand, and the population of lowlanders served by corresponding tertiary centers in Jeddah, Makkah, Jazan and Najran, on the other, the population incidence of AMI can be calculated and compared to give statistical backbone to the perceived association between AMI and chronic hypoxia.

The finding of more cases of MVT (predominantly in younger, female patients on oral contraceptive pills) causing AMI in this population as opposed to MAT in older patients comes with an onus to intervene. A change to less thrombogenic pills or a change to other birth control methods may be appropriate for female patients with one or more risk factors for thrombosis. Relocation of residence to sea level, which in most cases in this area involves a distance of less than 50 km such as from Abha to Ad Darb or Taif to Makkah may reduce their risks to thrombosis. Unless these benefits are printed in numbers, that should have been the outcome of this study, most clinicians will remain reluctant to discuss the matter with their patients.

Robert Sanda

Department of Surgery, Drumheller Hospital,
Drumheller, AB. T0J 0Y1, Canada

Correspondence to:

Dr. Robert B. Sanda,
Department of Surgery,
Drumheller Hospital, Drumheller,
AB. T0J 0Y1, Canada.
E-mail: robertsanda@yahoo.com

Page | 11

References

1. Schoch DM, LeSar CJ, Joels CS, Erdoes LS, Sprouse LR, Fugate MW, *et al.* Management of chronic mesenteric vascular insufficiency: an endovascular approach. *J Am Coll Surg* 2011;212:668-75; discussion 675-7.
2. Al-Shraim MM, Zafer MH, Rahman GA. Acute occlusive mesenteric ischemia in high altitude of southwestern region of Saudi Arabia. *Ann Afr Med* 2012;11: 5-10.
3. Anand AC, Jha SK, Saha A, Sharma V, Adya CM. Thrombosis as a complication of extended stay at high altitude. *Natl Med J India* 2001;14:197-201.
4. Kaleya RN, Boley SJ. Acute Mesenteric Vascular Disease. In: Hobson II RW, Wilson SE, Veith FJ. editors, *Vascular Surgery Principles and Practice*. 3rd ed. New York: Marcel Dekker Inc. ISBN 0-8247-0819-9. 2004. p. 839-59.
5. Hill AB. The environment and disease: association or causation? *Proc R Soc Med* 1965;58:295-300.
6. Addae S, Adzaku F, Mohammed S, Annobil S. Sickle cell disease in permanent residents of mountain and low altitudes in Saudi Arabia. *Trop Geogr Med* 1990;42:342-8.
7. al-Tahan A, Buchur J, el Khwsky F, Ogunniyi A, al-Rajeh S, Larbi E, *et al.* Risk factors of stroke at high and low altitude areas in Saudi Arabia. *Arch Med Res* 1998;29:173-7.
8. Igbiovvia A, Malik GM, Grillo IA, Seidi OA, Egere JU, Hachem MM, *et al.* Deep venous thrombosis in Assir region of Saudi Arabia. Case-control study. *Angiology* 1995;46:1107-13.
9. Khalid ME, Ali ME, Ahmed EK, Elkarib AO. Pattern of blood pressures among high and low altitude residents of southern Saudi Arabia. *J Hum Hypertens* 1994;8:765-9.