INVITED COMMENTARY

Abdominal Compartment Syndrome. Caution: Contents Under Pressure

John D. Kakisis *

Department of Vascular Surgery, "Attikon" University Hospital, School of Medicine, National and Kapodistrian, University of Athens, Athens, Greece

Abdominal compartment syndrome (ACS) is the consequence of various adverse events in the peritoneal cavity or the retroperitoneal space and, at the same time the cause of even more deleterious complications. Interestingly and in contrast to what most surgeons might think, ACS is not a recently recognised clinical entity, since the association between intra-abdominal hypertension and the decrease in urine output was reported for the first time almost 150 years ago.[1] Nevertheless, it was the description of intra-abdominal pressure (IAP) monitoring through an indwelling intravesical catheter that renewed the interest in ACS and brought it into everyday clinical practice.[2] Subsequent research revealed the effects of increased IAP on the cardiovascular, respiratory, urinary, gastrointestinal, hepatobiliary, and nervous systems as well as on the abdominal wall.[3]

The detrimental mix of causes and consequences involved in ACS after surgery for abdominal aortic aneurysm was described by Ersryd et al. in a study based on the Swedvasc registry, published in the current issue of the *European Journal of Vascular and Endovascular Surgery*.[4] Oedema was the leading cause of ACS found in 46.4% of the patients, followed by bleeding in 28.3%, and bowel ischaemia in 23.3%. Mortality was equally high irrespective of the underlying cause and was approximately 50% at three months. This finding is quite interesting and rather unexpected, since one would think that bowel ischaemia would be a predictor of poor survival, being by itself a potentially lethal complication. This assumption, however, was not verified by the Swedvasc registry and this simply underscores the fact that the aforementioned effects of ACS on the various systems are more severe than the underlying cause.

Another critical issue that was addressed in this study was the appropriate timing of decompressive laparotomy (DL). According to the European Society for Vascular Surgery 2019 Clinical Practice Guidelines on the Management of Abdominal Aorto-iliac Artery Aneurysms,[5] early diagnosis and management of intra-abdominal hypertension/ACS is recommended, with non-surgical management being the first line treatment. If conservative measures prove unsuccessful and a full blown ACS has developed, decompression is recommended. More practically, medical treatment to reduce IAP is recommended when IAP is between 12 and 20 mmHg, whereas DL is recommended when IAP is $>$ 30 mmHg, persistently $>$20 mmHg, or if organ failure is present. In line with these guidelines, in the Swedvasc Registry mean duration of IAP $\geq$15 mmHg was 8.5 h, indicating the initial attempt to reduce IAP conservatively, while mean duration of IAP $\geq$20 mmHg was only 2.0 h, indicating the urgent transfer of the patient to the operating room when medical therapy failed to reduce IAP.

It is noteworthy that the durations of IAP exceeding 15 and 20 mmHg were independent predictors of the need for renal replacement therapy, emphasising the need for close monitoring of ACS and early treatment. However, the overall 90 day mortality was 50% irrespective of the timing of DL. This is another interesting finding that could be attributed to type II statistical error. However, it could also reflect the morbidity and mortality associated with the open abdomen, including bowel fistula formation, retraction of the abdominal fascia, herniation, and intestinal adherence to the material used to close the abdomen.[3]

There is no doubt that the current weapons in our armamentarium for the management of ACS are weak and that an upgrade is needed if mortality is to be reduced from 50%. In the meantime, the least we can do is to use them appropriately and in a timely manner.

REFERENCES

1 Wendt E. Uber den Einfluss des Intraabdominalen Druckes auf die Absonderungsgeschwindigkeit des Harnes. *Arch Physiol Heilkunde* 1876;**57**:525–7.
2 Kron IL, Harman PK, Nolan SP. The measurement of intra-abdominal pressure as a criterion for abdominal re-exploration. *Ann Surg* 1984;**199**:28–30.
3 Papavramidis TS, Marinis AD, Pliakos I, Kesisoglou I, Papavramidou N. Abdominal compartment syndrome - intra-abdominal hypertension: defining, diagnosing, and managing. *J Emerg Trauma Shock* 2011;**4**:279–91.
4 Ersryd S, Gidlund KD, Wanhainen A, Smith L, Björck M. Abdominal compartment syndrome after surgery for abdominal aortic aneurysm: subgroups, risk factors and outcome. *Eur J Vasc Endovasc Surg* 2019;**58**:671–9.
5 Wanhainen A, Verzini F, Van Herzeele I, Allaire E, Bown M, Cohnert T, et al. Editor's choice – european society for vascular surgery (ESVS) 2019 clinical practice guidelines on the management of abdominal aorto-iliac Artery aneurysms. *Eur J Vasc Endovasc Surg* 2019;**57**:8–93.

DOI of original article: https://doi.org/10.1016/j.ejvs.2019.04.007
* Corresponding author. Department of Vascular Surgery, Athens University Medical School, Attikon, University. Hospital, Athens, Greece.
E-mail address: kakisis@med.uoa.gr (John D. Kakisis).

https://doi.org/10.1016/j.ejvs.2019.05.014