

Manu L. N. G. Malbrain
Michael L. Cheatham
Andrew Kirkpatrick
Michael Sugrue
Jan De Waele
Rao Ivatury

Abdominal compartment syndrome: it's time to pay attention!

Accepted: 29 June 2006
Published online: 1 August 2006
© Springer-Verlag 2006

M.M. is founding President of the World Society on Abdominal Compartment Syndrome and chairman of the 3rd World Congress on ACS

Sir: We read with interest the paper by Tiwari et al. [1] on the recognition and management of abdominal compartment syndrome (ACS) in the United Kingdom. Unlike many commonly encountered disease processes which remain within the purview of a given discipline, intra-abdominal hypertension (IAH) and ACS readily cross the usual barriers and may occur in any patient population regardless of age, illness, or injury [2]. As a result, no one scientific society or association can represent the wide variety of physicians, nurses, respiratory therapists, and other allied health-care personnel who might encounter patients with IAH and/or ACS in their daily practice. To fill this void, the World Society on Abdominal Compartment Syndrome (WSACS, www.wsacs.org) has been founded to serve as a peer-reviewed forum and educational resource for all healthcare providers as well as those in industry who have an interest in IAH and

ACS. The mission of the WSACS is to foster education, promote research, and thereby improve the survival of patients with IAH and ACS by bringing together physicians, nurses, and others from throughout the world and from a variety of clinical disciplines. The survey presented in *Intensive Care Medicine* therefore represents a major step forward overcoming the general lack of clinical awareness in dealing with IAH or ACS. By performing this kind of survey the respondents are forced to think and rethink their ideas and opinions on the subject based on recent and evolving data. In order to be concise and complete, and in addition to the excellent contribution by Tiwari et al., we have summarized the results of other surveys in Table 1. As we can here, see there is a wide range in the extent of knowledge about ACS, ranging from 22% in nonteaching hospitals to 75% among pediatricians and internists to 100% in (trauma) surgeons. Diagnosis also varies with the use of either intrabdominal pressure (IBP) alone or a combination with clinical examination or radiological imaging. Varying thresholds for defining ACS have been used, making it difficult to compare findings. The trigger for measuring IBP also varies with the underlying pathology. There is no consensus regarding definition, functional indications, or management of an open abdomen in the perceptions of Canadian trauma providers despite a high self reported level of familiarity with ACS [3]. This is an area of practice with potential and requirements for further multicenter study. Despite a widespread awareness of IAH and the ACS many physicians never measure IAP. When it is measured, the intravesical route (IBP)

is generally used. However, a significant percentage of physicians are totally unaware of current approaches to ACS management including IBP monitoring and decompressive laparotomy. No consensus exists on optimal timing of IBP measurement or on the threshold above which decompressive laparotomy should be performed. There is also significant variation in the management of IAH/ACS. While the authors have alluded to the occurrence of the ACS after nonsurgical conditions such as ascites and the use of an extracorporeal circulation, they did not specifically survey for extra-abdominal or secondary causes of the ACS [4]. We suspect that this would reveal even greater uncertainty and practice variation. Future research and education is necessary to establish clear diagnostic criteria and standards for treatment for these life threatening disease processes [5].

The presence of IAH and ACS are significant causes of organ failure, increased resource utilization, decreased economic productivity, and increased mortality among a wide variety of patient populations. Considerable progress has been made over the past decade, but there is significant work yet to be done. We must study and learn from the past and at the same time proactively “invent” the future. The future of IAH and ACS is in our hands, and the results from this and other surveys confirm the importance of IAH and ACS but also the shortcomings of our knowledge and understanding. It is time to pay attention—this is the slogan of our upcoming World Congress on Abdominal Compartment Syndrome, to be held in Antwerp, Belgium, 22–24 March 2007.

Table 1 Comparison of surveys on IAH and ACS. (ACS abdominal compartment syndrome, CT computed tomography, IAH intra-abdominal hypertension, IAP intra-abdominal pressure, IBP intrabladder pressure, NA not available, OF organ failure, UK United Kingdom, USA United States of America, NL The Netherlands, parentheses percentage of respondents)

	Kirkpatrick et al. [3]	Nagappan et al. [6]	Mayberry et al. [7]	Kimball et al. [5]	Ravishankar and Hunter [8]	Tiwari et al. [1]	Van Waes et al. ^a
Country	Canada	Australia	USA	USA	UK	UK	NL
Year	2006	2006	1999	2006	2005	2006	2005
Respondents	Trauma physicians	ICU registrars	Trauma surgeons	SCCM members	ICU	ICU	Surgeons
No. of questionnaires	102	40	292	4538	207	222	NA
Response rate (%)	86 (84)	36 (90)	292 (100)	1622 (35.7)	137 (66.2)	127 (57.2)	NA
Know ACS (%)	100	92	85	75-98	98.5	72.6-96.9	50-88
Measure IAP (%)	52	48-83	66-95	76-98	75.9	NA	NA
Diagnosis	Clinical (21%) IBP (95%) Stomach (13%)	IBP (83%) CT (17%)	Clinical + IBP (71%) IBP alone (14%)	Clinical + IBP (70%) IBP alone (7%) Clinical alone (20%)	Bladder (100%)	Clinical (68.4%) IBP (83.7%)	IBP (100%) (Stomach)
Threshold	25 mmHg + OF 34.3 mmHg - OF	20 mmHg (63.9%) 12 mmHg (11%)	20 cmH ₂ O (11%) 25 cmH ₂ O (22%) 30 cmH ₂ O (32%)	20-27 mmHg (42%) 12-19 mmHg (18-25%) 8 mmHg (0%)	NA	15-50 mmHg	25 cmH ₂ O 23 mmHg 20 mmHg + OF

^a Personal communication (2006)

References

1. Tiwari A, Myint F, Hamilton G (2006) Recognition and management of abdominal compartment syndrome in the United Kingdom. *Intensive Care Med* 32:906–909
 2. Ivatury RR, Cheatham ML, Malbrain ML, Sugrue M (2006). Abdominal compartment syndrome. *Landes Bioscience*, Georgetown
 3. Kirkpatrick AW, Laupland KB, Karmali S, Bergeron E, Stewart TC, Findlay C, Parry N, Khetarpal S, Evans D (2006) Spill your guts! Perceptions of Trauma Association of Canada member surgeons regarding the open abdomen and the abdominal compartment syndrome. *J Trauma* 60:279–286
 4. Kirkpatrick AW, Balogh Z, Ball CG, Ahmed N, Chun R, McBeth P, Kirby A, Zygun DA (2006) The secondary abdominal compartment syndrome: iatrogenic or unavoidable? *J Am Coll Surg* 202:668–679
 5. Kimball EJ, Rollins MD, Mone MC, Hansen HJ, Baraghoshi GK, Johnston C, Day ES, Jackson PR, Payne M, Barton RG (2006) Survey of ICU physicians on the recognition and management of intra-abdominal hypertension and abdominal compartment syndrome. *Crit Care Med* (in press)
 6. Nagappan R, Ernest D, Whitfield A (2005) Recognition and management of intra-abdominal hypertension and abdominal compartment syndrome. *Crit Care Resusc* 7:298–302
 7. Mayberry JC, Goldman RK, Mullins RJ, Brand DM, Crass RA, Trunkey DD (1999) Surveyed opinion of American trauma surgeons on the prevention of the abdominal compartment syndrome. *J Trauma* 47:509–513
 8. Ravishankar N, Hunter J (2005) Measurement of intra-abdominal pressure in intensive care units in the United Kingdom: a national postal questionnaire study. *Br J Anaesth* 94:763–766
- M. L. N. G. Malbrain (✉)
Ziekenhuis Netwerk Antwerpen, Intensive Care Unit,
Campus Stuivenberg, Lange Beeldekensstraat 267, 2060 Antwerpen 6, Belgium
e-mail: manu.malbrain@skynet.be
Tel.: +32-3-2177399
Fax: +32-3-2177279
- M. L. Cheatham
Orlando Regional Medical Center,
Department of Surgical Education,
86 West Underwood St., Orlando 32806, FL, USA
- A. Kirkpatrick
Foothills Hospital, Departments of Critical Care Medicine & Surgery,
1403 29 St. NW, T2N 2T9 AB Calgary, Canada
- M. Sugrue
University of New South Wales, Trauma,
Liverpool Hospital,
Sydney, Australia
- J. De Waele
Universitair Ziekenhuis Gent, Surgical Intensive Care Unit, Intensieve Zorgen 1K12-C,
De Pintelaan 185, 9000 Gent, Belgium
- R. Ivatury
Virginia Commonwealth University,
Surgery, Trauma and Critical Care, Medical Center,
Richmond Va., USA