

CLINICAL EXPOSURE AND ORGANIZATION  
OF THE CRITICAL CARE ROTATION DURING  
THE HAJJ PERIODS IN 1434-1435; PERSPECTIVES  
OF ARABIAN SAUDI ANESTHESIOLOGY  
PROGRAM RESIDENTS

ABDULAZIZ M BOKER<sup>1</sup>

**Abstract**

**Background:** The nature of massive mass gathering during Hajj was expected to provide a challenging and stimulating working experience for anesthesiology training program residents. A new rotation arrangement was reached between the Ministry of Health and the Saudi Commission of Health Specialties to recruit anesthesia resident to provide critical care services during the Hajj seasons in 1434 and 1435.

**Objectives:** This study aimed to explore the perspectives of anesthesia residents on their experience working among critical care teams during Hajj seasons in 1434H and 1435H at various locations of Makkah city and Al-Mashaer.

**Subjects and methods:** This cross-sectional study was conducted using a self-administered questionnaire distributed to all residents (n = 35) enrolled in anesthesia residency training program of the SCFHS and participated in critical care areas as locum during the Hajj seasons of 1434H and 1435H. Data was analyzed by using the statistical package of social science.

**Results:** The mean score of residents agreement on being treated with respect from both nurses and administration was the highest among the surveyed item (6.13 and 6.22 respectively). It was observed that, satisfaction of the residents with the direct observations and feedback provided to them (p = 0.01), the adequacy of the services components (p = 0.01) being treated with respect by the senior doctors and nurses (p = 0.03, p = 0.002) was significantly increased in the year 1435 compared to that of the year 1434. The satisfaction was generally higher in Makkah hospitals when compared to that of Al-Mashaer (Arafat and Menna) hospitals although this difference was of no statistical significance.

**Conclusion:** Hajj critical care rotations in 1434 and 1435 were well perceived by anesthesia residents. They found them useful as they give them the chance to gain self-confidence and experience the provision of healthcare services for mass gathering sessions.

**Keywords:** anesthesiology, mass gathering, critical care, rotations, residency training, hajj perspectives on Hajj rotations.

---

<sup>1</sup> Consultant & Associate Professor, Department of Anesthesia & Critical Care, Director, Clinical Skill Center, Faculty of Medicine, King Abdulaziz University, Jeddah, Saudi Arabia.

**Correspondence author:** Dr. Abdulaziz MA. Boker, MBBS, Med, FRCPC, Consultant & Associate Professor, Dep. of Anesthesia & Critical Care, Director, Clinical Skill Center, Faculty of Medicine, King Abdulaziz University, Jeddah, Saudi Arabia, P.B. Box: 80215, Jeddah 21589. E-mail: boker@hotmail.com, aboker@kau.edu.sa, Tel: 966-2-640-1000 (ext: 1-10199/10209), Fax: 009662640-8335.

## Introduction

The healthcare profession needs adequate medical residency training programs to increase its members' professional qualifications and to maintain patient safety<sup>1</sup>. Over the last few years, postgraduate medical training programs have to increase training capacity to meet the increasing number of medical school graduation rates and meet national health care shortages. Therefore, the postgraduate training programs in general and the anesthesia training programs in specific are aiming to prepare competent graduates with independent specialist practice<sup>2</sup>. The Saudi Commission for health Specialties (SCFHS) has an active five-year residency program to train residents to obtain certification in anesthesiology. The residency training program is divided into three junior years followed by two senior final years. The program is further subdivided into clinical rotations covering general anesthesia, critical care and subspecialties of anesthesia like cardiac anesthesia, neuroanesthesia, obstetric anesthesia and many more subspecialties and elective rotations.

Hajj (Pilgrimage) is a special season where more than two million Muslims from more than 150 countries gather every year at the holy shrine (Al-Mashaer) to perform this important ritual of Islam. Hajj is performed in Makkah and Al-Mashaer (includes Mina, Mozdalifah and Arafat) in the Kingdom of Saudi Arabia (KSA). The ritual starts on the 8<sup>th</sup> and ends on the 13<sup>th</sup> day of Dhul Hijjah, the 12<sup>th</sup> month of the lunar Islamic calendar year. Approximately 2 to 3 million pilgrims perform Hajj every year. Hajj is considered a major public health challenge that required an undivided attention from a number of governmental and non-governmental sectors in Saudi Arabia. Chief among the government sectors is the Ministry of Health (MOH) which provide free medical care to pilgrims<sup>3-5</sup>. In this decade a remarkable advancement has been made in the development of health services during Hajj seasons. The Saudi government allocated a lot of resources including health facilities, qualified personnel, materials and logistics to serve the pilgrims<sup>3</sup>.

For decades, anesthesiologists have contributed to the provision of healthcare during Hajj seasons for years through provision of anesthetic services at

operating rooms as well as support team working at the critical care units and emergency rooms. During the Hajj seasons intense health coverage of 1434H and 1435H, corresponded to October 6 to 20 2013, and September 25 to October 9, 2014 respectively, an agreement was reached with the main healthcare service provider, MOH, to recruit residents enrolled in anesthesia residency training program to cover locum duties in critical care areas. This was a great chance to increase the critical care training of the anesthesia residents and increase their self-confidence, it was considered a step to prepare residents for independent practice. This study aimed to explore the perspectives of anesthesiology training program residents on their experience working among critical care teams during Hajj seasons in 1434H and 1435H at various locations of Makkah city and field hospitals at Mena and Arafat locations.

## Subjects and Methods

The study was approved by the biomedical research ethics committee at the FOM, KAU. This cross-sectional study was conducted using a self-administered, anonymous questionnaire. It included some questions about demographic data of the residents, in addition to some questions about the general and specific training information of the Hajj rotation. Residents' response was classified according to seven Likert scale and was rated from strongly disagree (1) to strongly agree (7). The reliability of the questionnaire was calculated by Cronbach 's alpha and it was 0.79.

The questionnaire was distributed to all residents (n = 36) enrolled in anesthesia residency training program and participated in critical care areas as locum during the Hajj seasons of 1434H and 1435H, corresponded to October 13 to 18, 2013, and September 3 to 8, 2014 respectively. The response rate was 97.2% and 75.3% of the respondents were males (26 out of 35).

After data collection, it was analyzed using the statistical package of social science (SPSS) program version 16 Inc. The data were examined for normality in distribution using the Kolmogorov-Smirnov test. The quantitative data was expressed as mean and standard

deviation (SD). The Student t-test was used to test significance for quantitative data of two groups and the F-test was used to test significance for quantitative data of three groups. Person correlation coefficient test was used to study the correlation between the two quantitative parameters.  $p < 0.05$  is considered significant. The qualitative data were expressed as number and percentage. The  $\chi^2$ -test was used to test significance for qualitative data. The  $\chi^2$ -test with linear trend was used for ordinal data. Significance was considered at p value less than 0.05.

## Results

It was noticed that about 75% of the anesthesia residents participated in the Hajj rotation during the two seasons were male and about half of them were in the 3<sup>rd</sup> level of the anesthesia residency. The number of the residents in the rotation was doubled in the year 1435. They were coming from the three geographical regions of the kingdom namely, the eastern, western and middle regions with more or less equal distribution (Table 1).

Table 1  
Demographic data of the anesthesia resident trainees participated in the Hajj rotation

Parameter		Number	Percentage
Gender	Female	9	25.7
	Male	26	75.3
Level	3 <sup>rd</sup>	5	14.3
	4 <sup>th</sup>	17	48.6
	5 <sup>th</sup>	13	37.1
Region	Central	11	31.4
	Eastern	13	37.1
	Western	11	31.4
Number of rotation/Year	1434	22	36.1
	1435	39	63.9

Table 2  
Resident trainees-reported experience with training during the Hajj rotation according to gender and resident trainees level

Parameter	Gender		Resident trainees level			Total Mean $\pm$ SD
	Male	Female	3 <sup>rd</sup> level	4 <sup>th</sup> level	5 <sup>th</sup> level	
My education needs and goals were met	4.72 $\pm$ 1.2	5.44 $\pm$ 0.9	4.5 $\pm$ 0.7	5.4 $\pm$ 1.1	4.5 $\pm$ 1.0	5.03 $\pm$ 1.20
There was enough direct observation and feedbacks	4.88 $\pm$ 1.3	5.33 $\pm$ 1.1	5.6 $\pm$ 1.1	4.9 $\pm$ 1.3	4.9 $\pm$ 1.3	4.83 $\pm$ 1.63
The services components were excessive	5.27 $\pm$ 1.6	5.22 $\pm$ 1.9	5.8 $\pm$ 0.8	5.1 $\pm$ 1.9	5.2 $\pm$ 1.7	4.96 $\pm$ 1.84
I was treated with respect by senior doctors	5.15 $\pm$ 1.5	5.33 $\pm$ 1.1	4.8 $\pm$ 1.3	5.5 $\pm$ 1.4	4.9 $\pm$ 1.6	4.99 $\pm$ 1.62
I was treated with respect by the nurse	6.58 $\pm$ 1.0	5.78 $\pm$ 1.7	6.6 $\pm$ 0.5	6.5 $\pm$ 1.1	6.2 $\pm$ 1.7	6.13 $\pm$ 1.35
I was treated with respect by the administration	6.38 $\pm$ 1.3	6.11 $\pm$ 1.1	6.2 $\pm$ 1.3	6.6 $\pm$ 0.8	6.0 $\pm$ 1.6	6.22 $\pm$ 1.18
I was evaluated in fair manner	5.58 $\pm$ 1.7	6.11 $\pm$ 1.2	5.2 $\pm$ 1.5	6.4 $\pm$ 1.0	5.5 $\pm$ 2.0	5.76 $\pm$ 1.64
I will recommend this site to future training	6.31 $\pm$ 1.0	5.78 $\pm$ 1.1	6.4 $\pm$ 0.5	6.4 $\pm$ 0.9	5.6 $\pm$ 1.2	5.81 $\pm$ 1.29

Data is presented in the form of mean  $\pm$  standard deviation (SD). The Student t-test (when comparing two groups) or F-test (when comparing three groups) was used to compare the quantitative data between the two groups.  $p < 0.05$  is considered significant.

Table 3  
Resident trainees-reported experience with training during the Hajj rotation in 1434H and 1435H

Parameter	Hajj season			Region of the resident trainees			
	1434H	1435H	P value	Central	Eastern	Western	P value
My education needs and goals were met	4.67 ± 1.2	5.29 ± 1.1	0.15	4.90 ± 1.3	4.88 ± 0.8	5.11 ± 1.4	0.90
There was enough direct observation and feedbacks	4.26 ± 1.7	5.27 ± 1.2	0.01*	4.64 ± 1.2	5.31 ± 1.1	5.00 ± 1.4	0.43
The services components were excessive	4.28 ± 1.8	5.64 ± 1.6	0.01*	4.27 ± 2.0	6.08 ± 0.9	5.27 ± 1.7	0.03*
I was treated with respect by senior doctors	4.38 ± 1.8	5.36 ± 1.3	0.03*	4.73 ± 1.7	5.85 ± 0.9	4.91 ± 1.4	0.11
I was treated with respect by the nurse	5.59 ± 1.7	6.77 ± 0.5	0.002*	6.09 ± 1.8	6.54 ± 0.7	6.45 ± 1.2	0.68
I was treated with respect by the administration	6.0 ± 1.4	6.5 ± 0.8	0.33	6.09 ± 1.8	6.31 ± 0.9	6.55 ± 1.0	0.70
I was evaluated in fair manner	5.38 ± 1.9	6.27 ± 1.1	0.05	5.36 ± 2.1	6.46 ± 0.7	5.82 ± 1.6	0.23
I will recommend this site to future training	5.28 ± 1.4	6.55 ± 0.6	<0.001*	5.82 ± 1.3	6.46 ± 0.9	6.18 ± 0.9	0.33

Data is presented in the form of mean ± standard deviation (SD). The F-test was used to compare the quantitative data between the two

Table 4  
Resident trainees-reported experience with training during the Hajj rotation according to training locations

Parameter	Mean ± SD			P value
	Makkha	Arafat	Menna	
My education needs and goals were met	4.96 ± 1.16	4.8 ± 1.4	5.25 ± 1.2	0.59
There was enough direct observation and feedbacks	5.1 ± 1.23	4.25 ± 1.3	4.96 ± 1.8	0.27
The services components were excessive	5.26 ± 1.68	4.19 ± 2.1	5.04 ± 1.84	0.15
I was treated with respect by senior doctors	5.2 ± 1.43	4.06 ± 1.8	5.26 ± 1.60	0.03
I was treated with respect by the nurse	6.37 ± 1.6	5.8 ± 1.68	6 ± 1.24	0.73
I was treated with respect by the administration	6.31 ± 1.3	6.19 ± 0.8	6.11 ± 1.6	0.79
I was evaluated in fair manner	5.91 ± 1.56	5.69 ± 1.74	5.76 ± 1.63	0.73
I will recommend this site to future training	6.17 ± 1.04	5.62 ± 1.58	5.44 ± 1.3	0.04

Data is presented in the form of mean ± standard deviation (SD). F-test was used to compare the quantitative data between the two groups.  $p < 0.05$  is considered significant.

Table 5  
correlation between resident trainees-reported experience with training during the Hajj rotation and the duration of trainin

	Duration of training	
	r	P value
There was enough direct observation and feedbacks	0.37	0.001*
The services components were excessive	0.29	0.009*
I was treated with respect by senior doctors	0.33	0.002*

Person correlation coefficient was used to study the correlation between the two parameters.  $p < 0.05$  is considered significant.

The mean score of residents agreement on being treated with respect from both nurses and administration was the highest among the surveyed item (6.13 and 6.22 respectively). They agreed that they were fairly evaluated while somewhat agreed that their educational needs and goals were met. Although there was no significant difference in residents perception of the surveyed items between male and female, male residents strongly agreed more than the female residents that they were being treated with respect from both nurses and administration and they would recommend Hajj rotation for future training while the females perceived their evaluation as fair more than males (Table 2). Regarding the level of resident residents, there was no significant difference in perception of the surveyed items among the resident from different levels. Overall the perception of the 4<sup>th</sup> level residents was higher than those at the 3<sup>rd</sup> and 5<sup>th</sup> level (Table 2).

It was observed that, satisfaction of the residents with the direct observations and feedback provided to them was significantly increased ( $p = 0.01$ ) in the year 1435 compared to that of the year 1434. Not only that, their perception regarding the adequacy of the services components was also significantly increased ( $p = 0.01$ ) in the year 1435. Their agreement on being treated with respect by the senior doctors and nurses were increase significantly increased ( $p = 0.03$ ,  $p = 0.002$ ) in the year 1435 respectively. Overall, they significantly recommended the Hajj rotation for future training higher than those of the year 1434H (Table 3). Interesting, the residents from the eastern region of the kingdom rated the services components provided as excessive significantly more than ( $p = 0.03$ ) those from other regions (Table 3).

Regarding the training site, the satisfaction of the resident was generally higher in Makkah hospitals when compared to that of Al-Mashaer (Arafat and Menna) hospitals although this difference was of no statistical significance. Residents trained at Makkah hospitals reported that they would recommend this site for future training significantly higher ( $p = 0.04$ ) than those who trained at Arafat and Menna. On the other hand, residents trained at Arafat reported that they were treated with respect by senior doctors significantly lower ( $p = 0.03$ ) than the other two sites (Table 4).

There are significant positive correlation between the duration of training of the residents and they satisfaction with the amount of the direct observations and feedback provided to them ( $p = 0.001$ ), being treated with respect by the senior doctors ( $p = 0.002$ ) and agreement on the adequacy of the service components provided during the season ( $p = 0.001$ ) (Table 5).

## Discussion

Gathering of a large number of pilgrims during Hajj, the largest religious festivals worldwide, could compromise the health system of the host country but Saudi Arabia has extensive experience of providing health care at mass gatherings acquired through decades of managing millions of pilgrims at the Hajj<sup>6</sup>. It was reported that more than 25% of patients attended to the Haram medical center facilities in the year 1434 was referred to the Ajyad, Makkah and the King Abdulaziz Hospitals and others which indicated the need for more staff, patients' beds, and medicines at these locations<sup>7</sup>. It seemed that this problem was spotted, although not documented in published works, from the previous Hajj season in 1433H. In response to that an agreement was reached between the MOH and the SCFHS to recruit anesthesia residents to cover locum duties in critical care areas during the Hajj seasons in 1434 and 1435.

In this study, the perspectives of anesthesia residents on their training and working the Hajj seasons in 1434H and 1435H at various locations of Makkah city and Al-Mashaer were explored. Generally the experience of anesthesia training during Hajj rotation was well perceived by residents. The nature of massive mass gathering during Hajj might provide a challenging and stimulating working experience for anesthesia residents during this rotation. Hajj critical care rotation provided anesthesia residents ample opportunity to practice at the frontline.

The Hajj rotations provided resident with chances to work at various locations included established critical care units at formal hospitals in Makkah City as well as the critical care units at temporary and seasonal field hospitals. In this study it was observed that the residents were more satisfied, but of no statistical

significance, with the training at Makkah hospitals when compared to those of Al-Mashaer and this was reflected on their reporting that they will recommend Makkah for future training significantly higher than other hospitals in Al-Mashaer. The perception could be explained when understanding the difference between Makkah and Al-Mashaer hospitals. Makkah hospitals are well-equipped permanent ones, provided with infrastructure and stable, expert health providers teams who are provided with suitable comfortable accommodations and transport facilities. On the other hand, health workers at the seasonal hospital at Al-Mashaer were recruited from different areas and weren't acclimatized with each other and might following different health care systems. They were suffer from crowded accommodations, extra-workload and difficulty in transportation.

It was observed that the residents were not highly satisfied with the amount of the direct observation and feedbacks as well as the way they were treated with the senior doctors. This might be attributed to the stressful conditions under which the whole health team providers were working doing the Hajj seasons. During the hajj the working shift was lasting for 12 hours per day for consecutive 15 days with no break. In one of the recent studies conducted on Saudi residents in different specialties it was reported that stress was associated with higher workload (dealing with more patients and working more weekends), sleep deprivation (sleeping few hours and feeling un-refreshed after sleep) and dissatisfaction with colleagues<sup>8</sup>. This was consistent with other previous studies that identified the parameters associated with higher stress in residents, such as prolonged working hours, high patient load, critical patients assigned, night duty, poor sleep duration, and quality, poor work environment, and process failure<sup>9-11</sup>. Abdulghani et al., found significantly high levels of stress among the residents of SCFHS training programs namely, Internal Medicine, Emergency Medicine and Family Medicine and they reported that high levels of stress may have an effect on their working efficiency and general physical health<sup>12</sup>.

The satisfaction with training among the 5th level of residents was lower than those in the 3<sup>rd</sup> and 4<sup>th</sup> level, although it was of no statistically significance.

Generally the fierce competition lying ahead on the senior residents in the form of postgraduate examination, responsibility, high expectations, and suitable jobs making them less satisfied and at risk to stress as was reported by Abdulghani et al<sup>12</sup>.

One of the fundamental observations in this study that the residents experience with training in Hajj rotations of 1435 was almost all better than that of 1434H and they significantly recommended the Hajj rotation for future training higher than those of the year 1434. It is notably that anesthesia Hajj rotation was implemented for the first time in 1434 and neither the trainers nor the supervisors were sufficiently informed about the arrangements of accommodations, transportations and distribution of work hours. In 1435, the supervisors and trainers gained experience in managing all these tissues and tried to avoid much of the reported problems in the previous year. The perception of the residents regarding the adequacy of the services components was significantly increased in the year 1435 compare to that of 1434. It is worth mention that in the Hajj season of 1434, the MOH equipped 23 hospitals to serve the pilgrims of which 8 hospitals were seasonal. A total of 4,326 hospital beds as well as 110 emergency beds were available. The MOH, as well, provided 154 health centers for the pilgrims of which 112 were seasonal<sup>13</sup>. In the Hajj season of 1435, the MOH added 2 permanent hospitals at Makkah and the total number of the emergency beds reached 458 and the number of the seasonal health centers reached 114 in this reason<sup>14</sup>.

Publications in mass gatherings medicine, in general, and in Hajj-related health issues, in specific, were limited in number. In order to overcome this the Saudi MOH established the Global Center for Mass Gathering Medicine in 2012 in Riyadh. This center established an overarching board chaired by the Saudi MOH with membership of experts from the University College London, Public Health England, WHO, SCFHS, and the Saudi national research funding agency King Abdulaziz City for Science and Technology. This Center aims to drive the best health promotion, prevention guidelines and practice, and health education for attendees at the Hajj and other mass gatherings through provision of a scientific evidence base<sup>6</sup>.

In this study some limitations were existed; first, being cross-sectional one excluded the identification of any causal association adding to that the possibility of reporting bias from self-reported data and second, was the small sample size. Further studies on future performance of residents after their Hajj rotations is currently planned.

In conclusion, Hajj critical care rotations in 1434 and 1435 were well perceived by anesthesia residents. They found them useful as it was a great chance to increase their critical care training, their self-confidence. It was considered a step to prepare residents for independent practice. The Hajj is considered a great chance for residents training not only in anesthesia, but although in other all health specially.

### **Acknowledgment:**

This work was supported by the members of the Anesthesiology Training Program Central Training Committee at the SCFHS (Dr. Adel Kamal, Dr. Nizar Alzughibi, Dr. Ali Almomen, Dr. Tariq Jillani). Also, the chairman of Ministry of Health Hajj locum workforce committee, Dr. Ali Alghamdi, has been very keen and instrumental for the success of this project.

### **Conflict of interest**

The author reports no conflict of interest.

## References

- LOURENCAO LG, MOSCARDINI AC, SOLER ZA: Health and quality of life of medical residents. *Rev Assoc Med Bras*; 2010, 56:81-91.
- WELLER JM, MISUR M, NICOLSON S, MORRIS J, URE S, CROSSLEY J: Can I leave the theatre? A key to more reliable workplace-based assessment. *Br J Anaesth*; 2014, 112:1083-91.
- ELTAHIR AH: Development of health services in hajj seasons. *J Family Community Med*; 2000, 7(1):13-4.
- MADANI TA, GHABRAH TM, AL-HEDAITHY MA, ALHAZMI MA, ALAZRAQI TA, ALBARRAK AM, ISHAQ AH: Causes of hospitalization of pilgrims in the Hajj season of the Islamic year 1423 (2003). *Ann Saudi Med*; 2006, 26(5):346-51.
- AL-HOQAIL IA, ABDALLA AM, SAEED AA, AL-HAMDAN NA, BAHNASSY AA: Pilgrims satisfaction with ambulatory health services in Makkah. *J Fam Comm Med*; 2008, 17(3):135-40. 2010. doi: 10.4103/1319-1683.74331.
- MEMISH ZA, ZUMLA A, ALHAKHEEM RF, ASSIRI A, TURKESTANI A, AL HARBY KD, ALYEMNI M, DHAFAR K, GAUTRET P, BARBESCHI M, McCLOSKEY B, HEYMAN D, AL RABEEAH AA, AL-TAWFIQ JA, HAJI: infectious disease surveillance and control. *Lancet*; 14, 383(9934): 2073-82. 2014 doi: 10.1016/S0140-6736(14)60381-0.
- BAKHSH AR, SINDY AI, BALJOON MJ, DHAFAR KO, GAZZAZ ZJ, BAIG M, DEIAB BA, AL HOTHALI FT: Diseases pattern among patients attending Holy Mosque (Haram) Medical Centers during Hajj 1434 (2013). *Saudi Med J*; 2015, 36(8):962-966. doi: 10.15537/smj.2015.8.1212.
- ALOSAIMI FD, KAZIM SN, ALMUFLEH AS, ALADWANI BS, ALSUBAIE AS: Prevalence of stress and its determinants among resident trainees in Saudi Arabia. *Saudi Med J*; 2015, 36(5):605-612. doi: 10.15537/smj.2015.5.10814.
- NDOM RJ, MAKANJUOLA AB: Perceived stress factors among resident doctors in a Nigerian teaching hospital. *West Afr J Med*; 2004, 23: 232-235.
- WRENN K, LORENZEN B, JONES I, ZHOU C, ARONSKY D: Factors affecting stress in emergency medicine resident trainees while working in the ED. *Am J Emerg Med*; 2010, 28:897-902.
- LEBENSOHN P, DODDS S, BENN R, BROOKS AJ, BIRCH M, COOK P, ET AL: Resident wellness behaviors: relationship to stress, depression, and burnout. *Fam Med*; 2013, 45:541-549.
- ABDULGHANI HM, AL-HARBI MM, IRSHAD M: Stress and its association with working efficiency of junior doctors during three postgraduate residency training programs. *Neuropsychiatric Dis Treat*; 11:3023-3029, 2015. doi:10.2147/NDT.S92408.
- Ministry of Health 2013. Health Statistics Annual Book. <http://www.moh.gov.sa/en/Ministry/Statistics/book/Documents/Statistics-Book-1434.pdf>
- Ministry of Health 2014. Health Statistics Annual Book. <http://www.moh.gov.sa/en/Ministry/Statistics/book/Documents/Statistical-Book-for-the-Year-1435.pdf>



bridion<sup>®</sup>  
sugammadex

Predictable. Complete. Rapid.

## BRIDION—for optimal neuromuscular blockade management and improved recovery

### Predictable and complete reversal

- 98% of BRIDION patients recovered to a TOF<sup>\*</sup> ratio of 0.9 from reappearance of T<sub>2</sub><sup>†</sup> within 5 minutes<sup>2</sup>
- 97% of BRIDION patients recovered to a TOF<sup>\*</sup> ratio of 0.9 from 1 to 2 PTCs<sup>†</sup> within 5 minutes<sup>3</sup>

### Rapid reversal

- BRIDION rapidly reversed patients from reappearance of T<sub>2</sub><sup>†</sup> in 1.4 minutes<sup>2</sup>
- BRIDION rapidly reversed patients from 1 to 2 PTCs<sup>†</sup> in 2.7 minutes<sup>3</sup>

**BRIDION is indicated for the reversal of neuromuscular blockade induced by rocuronium or vecuronium. In children and adolescents (aged 2-17 years), BRIDION is only recommended for routine reversal of moderate rocuronium-induced neuromuscular blockade<sup>1</sup>**

#### Important safety information

BRIDION is not recommended in patients with severe renal impairment. Studies in patients with hepatic impairment have not been conducted and, therefore, patients with severe hepatic impairment should be treated with great caution. Caution should be exercised when administering BRIDION to pregnant women as no clinical data on exposed pregnancies are available.

BRIDION has not been investigated in patients receiving rocuronium or vecuronium in the Intensive Care Unit (ICU) setting.

If neuromuscular blockade is required within 24 hours of BRIDION administration, a nonsteroidal neuromuscular blocking agent should be used instead of rocuronium or vecuronium. The most commonly reported adverse reactions were dysgeusia (metal or bitter taste) and anesthetic complications (movement, coughing, grimacing, or suckling on the endotracheal tube). In patients treated with BRIDION, a few cases of awareness were reported. The relation to BRIDION was uncertain. In a few individuals, allergic-like reactions (ie, flushing, erythematous rash) following BRIDION were reported. Clinicians should be prepared for the possibility of allergic reactions and take the necessary precautions. In a trial of patients with a history of pulmonary complications, bronchospasm was reported in 2 patients and a causal relationship could not be fully excluded. Volunteer studies have demonstrated a slight (17%-22%) and transient (<30 minutes) prolongation of the prothrombin time/activated partial thromboplastin time (PT/aPTT) with BRIDION; however, clinical studies have demonstrated no clinically relevant effect on peri- or postoperative bleeding complications with BRIDION alone or in combination with anticoagulants. As BRIDION has demonstrated an in vitro pharmacodynamic interaction with anticoagulants, caution should be exercised in patients on anticoagulation for a pre-existing or comorbid condition. This pharmacodynamic interaction is not clinically relevant for patients receiving routine postoperative prophylactic anticoagulation. Although formal interaction studies have not been conducted, no drug interactions were observed in clinical trials. Preclinical data suggest that clinically significant drug interactions are unlikely with the possible exceptions of toremifene, fusidic acid, and hormonal contraceptives.

<sup>\*</sup> Train-of-four  
<sup>†</sup> Post tetanic counts  
<sup>‡</sup> Second twitch

REFERENCES: 1. BRIDION Summary of Product Characteristics (SPC). 2. Blobner M, Eriksson LI, Scholz J, Motsch J, Della Rocca G, Prins ME. Reversal of rocuronium-induced neuromuscular blockade with sugammadex compared with neostigmine during sevoflurane anaesthesia: results of a randomised, controlled trial. [published online ahead of print July 30, 2010]. *Eur J Anaesthesiol*. doi:10.1097/EJA.0b013e32833d5eb7. 3. Jones RK, Caldwell JE, Brill SJ, Soto RG. Reversal of profound rocuronium-induced blockade with sugammadex: a randomized comparison with neostigmine. *Anesthesiology*. 2008;109(5):816-824.

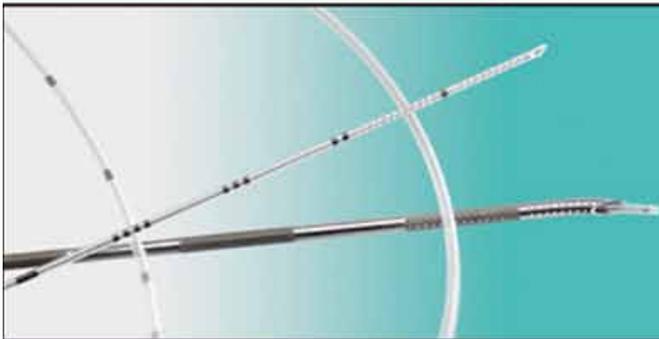
Please see summary of product characteristics for full prescribing information.



Copyright © 2010 Merck Sharp & Dohme Corp., a subsidiary of Merck & Co., Inc., Whitehouse Station, NJ, USA. All rights reserved. 05-2013-BRID-2011-LEVANT-1196-J

**PAJUNK®**

Pioneering Medical Tehnology



**TAP Block And InfiltraLong**  
For Effective Treatment  
Of Long And Deep Incisions

### **Sono Cannulas**

For Single Shot UltraSound  
Guided Nerve Blocks



### **SonoSystem And SonoLong Curl**

For UltraSound Guided Nerve Blocks



### **Sprotte® 2.G**

The New Generation  
Dura Puncture In Minimum Time



### **SonoEye Ophtalmic Block**

For Peribulbar And Retrobulbar  
Blocks Under Ultrasonic Monitoring



LMA™  
Better by Design

**Question.**

Your patient requires urgent pain medication. How can you administer this less invasively?

**Answer.**



LMA™  
Better by Design

**LMA MAD Nasal™**  
Needle-free intranasal drug delivery device

**Atomization spray**

The spray atomizes drugs into a fine mist of particles 30-100 microns in size.<sup>1</sup>

**Malleable stylet**

The malleable stylet allows 180° positioning of the nasal plug.

**Accurate dosing**

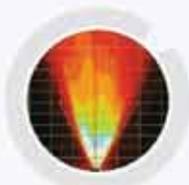
The syringe enables the accurate measurement of drugs to be delivered.

**Pressure**

High applied pressure ensures that drugs are atomized into a fine mist of particles through the tip of the plug.

**Soft conical plug**

The plug forms a seal with the nostril preventing expulsion of fluid.



**Spray geometry**

Spray cone with a wide 62.75° average spray angle and a 36.9mm average plume width.<sup>1</sup>

**References:**

1. Talon M. et al., J Burn Care Research 2009; 30: 599-605.
2. MAD (Mucosal Atomization Device) Medical Atomizer In Vitro Spray Characterization, 2011



**It's like flying business class  
and paying coach fare.**



In an uncertain world where perioperative care is increasingly complex, uptime is critical. GE's anesthesia portfolio is known for dependable quality and a commitment to reliable performance that helps reduce operational costs long after the point of purchase. Today, GE Healthcare is changing the game and redefining affordable performance for the masses. No compromises. No boundaries.

Carestation 600 Series...It's all within reach.

[gehealthcare.com](http://gehealthcare.com)

© 2015 General Electric Company - All rights reserved.  
GE and GE Monogram are trademarks of General Electric Company.  
JB28064XX

Exclusive Dealer

**C.M.M.** S.A.R.L.  
SUPPLIES & SERVICES

[www.cmm\\_lb.com](http://www.cmm_lb.com)

Vanlian Center, Fuad Chehab Ave. Sin El Fil, Beirut, Lebanon

P.O.Box: 166804 T:+961 (0)1 512 820 +961 (0)1 512 821

M:+961 70 101 740 F:+961 (0)1 512 822