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全身麻醉复合硬膜外麻醉与全身麻醉对老年腹部肿瘤手术患者的影响 *

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摘要 目的：探究全身麻醉复合硬膜外麻醉与全身麻醉对老年腹部肿瘤手术患者影响。**方法：**选择 2015 年 10 月 -2018 年 10 月于我院进行手术治疗的老年腹部肿瘤患者 96 例，随机分为两组，每组 48 例患者。其中，对照组患者给予全身麻醉，研究组患者联合硬膜外麻醉，对比两组患者的麻醉指标、围术期指标、应激激素指标、肺功能指标和不同时间点血清 NSE、S100β 浓度的变化。**结果：**研究组患者的瑞芬太尼用量、异丙酚用量、苏醒时间、拔管时间均显著少于(短于)对照组($P<0.05$)；对照组患者术后肾上腺素、去甲肾上腺素、皮质醇等指标水平均比术前显著升高($P<0.05$)；研究组患者术后的去甲肾上腺素水平显著高于术前($P<0.05$)，但肾上腺素、皮质醇与术前无显著性差异($P<0.05$)；随着治疗时间推移，两组患者手术 1 h 时、手术时 2 h 时、术毕时血清 NSE、S100β 浓度呈逐渐升高趋势，且研究组患者以上指标均明显低于对照组 ($P<0.05$)；对照组患者术后的(MVV-VE)/FEV1、MVV/FEV1 指标水平均比术前显著降低 ($P<0.05$)；RV/TLC 水平比术前显著升高 ($P<0.05$)；但研究组患者术后的(MVV-VE)/FEV1、MVV/FEV1、RV/TLC 等指标与术前无显著差异($P>0.05$)。**结论：**与全身麻醉相比，全身麻醉复合硬膜外麻醉可更有效改善老年腹部肿瘤患者手术指标，并控制机体应激反应和降低麻醉过程对脑部的损伤，且对其肺功能影响较小。

关键词：全身麻醉；硬膜外麻醉；腹部肿瘤；应激激素

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Effect of General Anesthesia Combined with Epidural Anesthesia and General Anesthesia on the Elderly Patients with Abdominal Tumor*

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ABSTRACT Objective: To investigate the effects of general anesthesia combined with epidural anesthesia and general anesthesia on the elderly patients with abdominal tumors. **Methods:** Ninety-six elderly patients with abdominal tumors who underwent surgery from October 2015 to October 1818 were randomly divided into two groups, 48 patients in each group.Among them, patients in the control group were given general anesthesia, and patients in the study group were combined with epidural anesthesia. The anesthesia index, perioperative index, stress hormone index, lung function index and serum NSE and S100β concentration at different time points were compared between the two groups. **Results:** The doses of remifentanil, propofol, wake-up time and extubation time in the study group were significantly less than (shorter than) control group ($P<0.05$). In the control group, the levels of postoperative adrenaline, norepinephrine and cortisol were significantly higher than those before surgery ($P<0.05$). With the treatment time, the serum NSE and S100β concentrations in the two groups were gradually increased at 1 h after surgery, 2 h after surgery, and at the end of surgery, but the patients in the study group were lower than the control group($P<0.05$). The levels of (MVV-VE)/FEV1 and MVV/FEV1 in the control group were significantly lower than those before surgery($P<0.05$). The RV/TLC level was significantly higher than that before surgery($P<0.05$). However, there were no significant differences between the study group (MVV-VE)/FEV1, MVV/FEV1, RV/TLC and preoperative($P>0.05$); **Conclusion:** Compared with general anesthesia, general anesthesia combined with epidural anesthesia can more effectively improve the surgical parameters of elderly patients with abdominal tumors, and control the body's stress response and reduce brain injury during anesthesia and have little effect on the lung function.

Key words: General Anesthesia; Epidural Anesthesia; Abdominal Tumor; Stress Hormone

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前言

腹部肿瘤主要包括胃癌、腹壁肿瘤、肝癌、大肠癌、小肠肿

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瘤等[1],临床治疗以手术切除为主,具有创伤性大、手术时间长、术中出血量大等特点[2,3]。老年患者免疫力差、机体生理功能减弱，多数患者在实施腹部肿瘤切除术时出现明显的应激反应，如处理不当可危及其生命[4-6]。因此,积极寻找安全、高效的麻醉药物和麻醉方式尤为重要。

全身麻醉是指麻醉药经静脉、肌肉注射、呼吸道吸入进入体内,产生暂时性中枢神经系统抑制,当药物经机体代谢后,患者的神志及各种反射均会逐渐恢复[7-9],但其单独使用麻醉效果不佳,且安全性较低。据相关报道显示老年腹部肿瘤患者术后在一定时间内会出现神经错乱、记忆自理能力受损等神经系统并发症[10,11]。但对如何降低此类并发症、减轻患者脑损害等相关研究报道较少。本研究通过探究全身麻醉复合硬膜外麻醉与全身麻醉对老年腹部肿瘤患者的影响,旨在为临床指导老年患者选择最佳麻醉方式提供参考依据,具体内容报道如下。

1 资料与方法

1.1 一般资料

选择于我院进行手术治疗的老年腹部肿瘤患者 96 例,随机分为两组,每组 48 例患者。其中,对照组男 26 例,女 22 例,平均年龄为 57.4± 6.8 岁;平均体质指数(BMI)为 22.1± 1.0 kg/m^2,肿瘤类型:直肠癌 20 例,乙状结肠癌 13 例,胃癌 8 例,间质瘤 6 例,横结肠癌 1 例,研究组男 28 例,女 20 例,平均年龄为 57.0± 7.1 岁;平均体质指数(BMI)为 21.9± 1.3 kg/m^2,肿瘤类型:直肠癌 21 例,乙状结肠癌 12 例,胃癌 10 例,间质瘤 4 例,横结肠癌 1 例,两组患者的基础资料比较无统计学差异(P>0.05),具有可比性。

1.2 纳入和排除标准

纳入标准:(1)老年腹部肿瘤患者,且经手术治疗者;(2)自愿参与本次研究。

排除标准:(1)患有心衰、高血压等免疫疾病者;(2)存在颅脑手术史及脑部疾病者;(3)存在麻醉禁忌症者;(4)存在精神疾病或神经病史者;

1.3 治疗方法

研究组:指导患者取左侧卧位,给予手术部位硬膜外穿刺并置管,经导管注入 2%利多卡因 4 mL,5 min 后追加利多卡因 8-10 mL,10 min 后测定平面并实施全身麻醉。麻醉诱导:静脉输入 0.04 mg/kg 咪唑安定、3 μg/kg 芬太尼、0.3 mg/kg 依托咪酯进行全麻诱导,麻醉诱导后,给予气管插管机械通气。维持麻醉:于硬膜外泵入利多卡因 5 mL,持续泵入瑞芬太尼(0.1-0.125 g/kg·min)和丙泊酚(6-10 mg/kg·h),并根据手术情况间断泵入爱可松(0.1-0.3 mg/kg);对照组:根据情况于全身麻醉处持续泵入瑞芬太尼和丙泊酚,并根据情况追加爱可松,剂量同研究组。

1.4 观察指标

(1) 统计并对比两组患者的手术时间、麻醉时间、术中出血量、瑞芬太尼用量、异丙酚用量、苏醒时间、拔管时间等指标[12];(2) 对比两组患者术前、术后 3 d 肾上腺素、去甲肾上腺素、皮质醇等指标水平[13];(3) 对比两组患者手术前 1 d、手术 1 h 时、手术时 2 h 时、术毕等时间点血清 NSE、S100β 浓度[14];(4) 对比两组患者术前、手术后 3 d(MVV-VE)/FEV1、MVV/FEV1、RV/TLC 等指标水平[15]。

1.5 统计学分析

采用 SPSS18.0 统计学软件进行数据分析，计数资料以百分比、例数表示,组间比较采用 x^2 检验;计量资料以均数± 标准差表示,组间比较采用 t 检验,以 P<0.05 表示差异存在统计学意义。

2 结果

2.1 两组患者麻醉指标及围术期指标对比

经对比,研究组患者的瑞芬太尼用量、异丙酚用量、苏醒时间、拔管时间均显著少于(短于)对照组(P<0.05),两组手术时间、麻醉时间、术中出血量均无统计学差异(P>0.05),见表 1。

表 1 两组患者麻醉指标及围术期指标对比(均数± 标准差)

Table 1 Comparison of the anesthesia index and perioperative index between the two groups (mean ± standard deviation)

Groups	Operation time (min)	Anesthesia time (min)	Intraoperative blood loss(mL)	Remifentanil dosage(μg/kg·min)	Propofol dosage (μg/kg·min)	Wake up time (min)	Extubation time (min)
Research group (n=48)	312.8± 10.9	204.6± 18.9	261.4± 7.5	0.11± 0.02#	4.42± 0.12#	18.8± 4.2#	23.1± 3.7#
Control group (n=48)	314.2± 10.1	208.4± 13.6	260.7± 8.2	0.23± 0.04	5.65± 0.29	37.2± 3.5	40.8± 4.6

Note: Compared with the control group, #P<0.05.

2.2 两组患者术前和术后应激激素水平变化的对比

两组患者术前肾上腺素、去甲肾上腺素、皮质醇等指标水平比较均无显著性差异(P>0.05);对照组患者术后上述指标水平均显著高于术前(P<0.05);研究组患者术后的去甲肾上腺素水平显著高于术前(P<0.05),但肾上腺素、皮质醇与术前比较无显著性差异(P<0.05);结果见表 2。

2.3 两组患者不同时间点血清 NSE、S100β 水平的对比

两组患者手术前 1 d 的血清 NSE、S100β 浓度对比无显著性差异(P<0.05);随着治疗时间推移,两组患者手术 1 h 时、手术时 2 h 时、术毕时血清 NSE、S100β 浓度呈逐渐升高趋势,但研究组患者血清 NSE、S100β 水平均显著低于对照组(P<0.05),结果见表 3。

2.4 两组患者术前和术后肺功能指标的对比

两组患者术前 (MVV-VE)/FEV1、MVV/FEV1、RV/TLC 水平对比均无显著性差异 (P>0.05);对照组患者术后的 (MVV-VE)/FEV1、MVV/FEV1 水平均比术前显著降低 (P<

0.05)；RV/TLC 水平比术前显著升高($P<0.05$)；但研究组患者术后的 (MVV-VE)/FEV1、MVV/FEV1、RV/TLC 等指标与术前比较均无显著差异($P>0.05$)，结果见表 4。

表 2 两组患者术前和术后应激激素水平变化的对比(均数± 标准差)

Table 2 Comparison of the changes of stress hormones levels between the two groupsbefore and after surgery (mean ± standard deviation)

Groups	Times	Adrenaline(pg/mL)	Norepinephrine(pg/mL)	Cortisol(ng/mL)
Research group(n=48)	Before surgery	72.8± 23.7	358.9± 62.8	241.5± 70.1
	3 d after surgery	74.2± 24.5	421.3± 92.5*	248.0± 70.6
Control group(n=48)	Before surgery	73.0± 21.5	359.3± 61.4	243.2± 68.3
	3 d after surgery	103.1± 27.3*	461.7± 104.3*	270.5± 72.7*

Note: *$P<0.05$ compared with before surgery.

表 3 两组患者不同时间点血清 NSE、S100β 水平的对比(均数± 标准差)

Table 3 Comparison of the serum NSE and S100β concentrations at different time points between the two groups (mean ± standard deviation)

Groups	Times	NSE(ng/mL)	S100β(pg/mL)
Research group(n=48)	At 1d before surgery	9.2± 2.5	81.5± 14.9
	At 1h at the time of surgery	10.1± 3.2#	96.3± 21.2#
	At 2h at the time of surgery	12.0± 3.9#	102.6± 25.8#
	At the end of surgery	15.2± 4.8#	111.4± 28.3#
Control group(n=48)	At 1d before surgery	9.0± 2.9	82.4± 15.2
	At 1h at the time of surgery	14.3± 3.5	111.2± 18.3
	At 2h at the time of surgery	17.5± 4.2	128.4± 26.7
	At the end of surgery	22.4± 5.1	155.7± 30.6

Note: *$P<0.05$ compared with before surgery.

表 4 两组患者术前和术后肺功能指标的对比(均数± 标准差)

Table 4 Comparison of the lung function index between the two groups before and after surgery (mean ± standard deviation)

Groups	Times	(MVV-VE)/FEV1	MVV/FEV1	RV/TLC
Research group(n=48)	Before surgery	90.6± 8.4	84.6± 9.6	32.3± 3.1
	3 d after surgery	87.5± 8.0	81.1± 9.1	33.1± 3.2
Control group(n=48)	Before surgery	90.4± 8.9	84.9± 9.3	32.2± 3.6
	3 d after surgery	71.2± 7.6*	67.5± 8.9*	47.3± 4.2*

Note: *$P<0.05$ compared with before surgery.

3 讨论

全身麻醉和硬膜外麻醉作为临床上较常见的麻醉方式[19,20]，本研究将其联合应用于老年腹部肿瘤切除术患者的治疗过程中，结果显示研究组患者的瑞芬太尼用量、异丙酚用量、苏醒时间、拔管时间均显著少于(短于)对照组，提示全身麻醉复合硬膜外麻醉可有效改善老年腹部肿瘤患者手术指标。分析其原因为：机体经复合式麻醉后，硬膜外麻醉可有效加快麻醉药物在体内的代谢时间，降低了残留麻醉药物对机体神经系统的损伤。

应激反应是机体防御外来刺激时出现的一类非特异反应，应激症状包括心跳加速、血糖、血压升高等。多数情况下，应激反应对机体具有较好的保护作用，但在某些情况下也会产生负面影响[21-23]。麻醉药物作为引起机体应激反应的重要原因，尤其对于老年患者而言，严重不良反应的发生则意味着手术风险的上升[24,25]。本研究结果显示对照组患者术后肾上腺素、去甲肾上腺素、皮质醇等指标水平均比术前显著升高，研究组患者术后的去甲肾上腺素水平显著高于术前，但肾上腺素、皮质醇与术前无显著性差异，表明全身麻醉复合硬膜外麻醉可有效控制老年腹部肿瘤切除术患者的机体应激反应。由于老年群体多伴随有免疫力差和生理功能衰退等特点，对麻醉和手术的耐受性较差，加之，腹部肿瘤切除术引发的创伤性较大，对麻醉效果和安全性要求均较高，如若麻醉方式不当易对患者的呼吸功能产生一定影响，引发肺部感染[26,27]。本研究结果显示对照组患者术后的(MVV-VE)/FEV1、MVV/FEV1 指标水平均比术前显著降低，RV/TLC 水平比术前显著升高，但研究组患者术后的 (MVV-VE)/FEV1、MVV/FEV1、RV/TLC 等指标与术前无显著差异，表明全身麻醉复合硬膜外麻醉对老年腹部肿瘤切除术患者肺功能影响较小。

术后认知功能障碍(POCD)是老年及大型手术麻醉后常见的并发症或麻醉后遗症。血清 NSE、S-100β 蛋白被证实可以预

测 POCD 发生的血清学生化指标[28]。S100β 蛋白是一种酸性蛋白，由神经胶质细胞合成并分泌，当机体中枢神经系统细胞受到损伤时，S-100β 蛋白从损伤部位被释放进入脑脊液，再经血 - 脑脊液屏障进入血液循环中。NSE 是一种糖酵解酶，存在于神经细胞内，在机体神经细胞受损时，大量 NSE 可从受损的神经元漏出并释放至血管中，通过由于麻醉所导致的血 - 脑脊液屏障受损位置进入脑脊液和体循环中，从而使其在血清中的含量激剧升高[29]。因此，检测 S100β 蛋白、NSE 浓度变化可作为判断机体脑损伤的重要标记物[30]。本研究结果显示两组患者手术 1 h 时、手术时 2 h 时、术毕时血清 NSE、S100β 浓度呈逐渐升高趋势，但研究组患者均低于对照组，表明全身麻醉复合硬膜外麻醉可有效降低麻醉过程对老年腹部肿瘤切除术患者脑部的损伤。

综上所述，全身麻醉复合硬膜外麻醉可有效改善老年腹部肿瘤患者手术指标，并控制机体应激反应和降低麻醉过程对脑部的损伤，且对其肺功能影响较小。

参 考 文 献(References)

[1] Donmez T, Erdem V M, Uzman S, et al. Laparoscopic cholecystectomy under spinal-epidural anesthesia vs. general anaesthesia: a prospective randomised study[J]. Annals of Surgical Treatment & Research, 2017, 92(3): 136-142

[2] Liu F, Zhang J, Zeng X Q, et al. Application of general anesthesia combined with epidural anesthesia/analgesia in rehabilitation after gastric cancer resection [J]. Zhonghua Yi Xue Za Zhi, 2017, 97(14): 1089

[3] Kobayashi K, Narimatsu N, Oyoshi T, et al. Spinal cord infarction following epidural and general anesthesia: a case report [J]. Ja Clinical Reports, 2017, 3(1): 42

[4] Yang B, Qian F, Li W, et al. Effects of general anesthesia with or without epidural block on tumor metastasis and mechanisms[J]. Oncology Letters, 2018, 15(4): 4662

[5] Li M H, Xu Z Z, Huang S M, et al. Effect of combined epidural anaesthesia on tumor-infiltrating lymphocytes in lung adenocarcinoma: a prospective exploratory sub-analysis [J]. Acta Anaesthesiol Scand, 2018, 62(5): 687-700

[6] Funao H, Isogai N, Daimon K, et al. A rare case of intradural and extramedullary epidermoid cyst after repetitive epidural anesthesia: case report and review of the literature [J]. World Journal of Surgical Oncology, 2017, 15(1): 131

[7] Zhu J, Zhang X R, Yang H. Effects of combined epidural and general anesthesia on intraoperative hemodynamic responses, postoperative cellular immunity, and prognosis in patients with gallbladder cancer: A randomized controlled trial[J]. Medicine, 2017, 96(10): e6137

[8] Qiang X, Shi N J, Hao Z, et al. Effects of combined general-epidural anesthesia and total intravenous anesthesia on cellular immunity and prognosis in patients with non-small cell lung cancer: A comparative study[J]. Molecular Medicine Reports, 2017, 16(4): 4445-4454

[9] Song P, Dong T, Zhang J, et al. Effects of different methods of anesthesia and analgesia on immune function and serum tumor marker levels in critically ill patients [J]. Experimental & Therapeutic Medicine, 2017, 14(3): 2206-2210

[10] Qiang X, Shi N J, Hao Z, et al. Effects of combined general-epidural anesthesia and total intravenous anesthesia on cellular immunity and prognosis in patients with non-small cell lung cancer: A comparative study[J]. Molecular Medicine Reports, 2017, 16(4): 4445-4454

[11] Erdem V M, Donmez T, Uzman S, et al. Spinal/epidural block as an alternative to general anesthesia for laparoscopic appendectomy: a prospective randomized clinical study [J]. Videosurgery & Other Miniinvasive Techniques, 2018, 13(2): 148-156

[12] Uzman S, Donmez T, Erdem V M, et al. Combined spinal-epidural anesthesia in laparoscopic appendectomy: a prospective feasibility study [J]. Annals of Surgical Treatment & Research, 2017, 92(4): 208-213

[13] Houri K, Hamasaki S, Tsujimoto T, et al. A spinal cord infarction that occurred after laparoscopic gastrectomy performed under general anesthesia and epidural analgesia[J]. Ja Clinical Reports, 2018, 4(1): 6

[14] Demiryas S, Donmez T, Erdem V M, et al. Comparison of the effects of spinal epidural and general anesthesia on coagulation and fibrinolysis in laparoscopic cholecystectomy: a randomized controlled trial: VSJ Competition, 2nd place [J]. Videosurgery & Other Miniinvasive Techniques, 2017, 12(3): 330-340

[15] Yadeau J T. CORR Insights @ : Hypotensive Epidural Anesthesia Reduces Blood Loss in Pelvic and Sacral Bone Tumor Resections[J]. Clinical Orthopaedics & Related Research, 2017, 475(3): 1-2

[16] Moon E J, Go Y J, Chung J Y, et al. Non-intubated thoracoscopic surgery for decortication of empyema under thoracic epidural anesthesia: a case report[J]. Korean J Anesthesiol, 2017, 70(3): 341-344

[17] Uzman S, Donmez T, Erdem V M, et al. Combined spinal-epidural anesthesia in laparoscopic appendectomy: a prospective feasibility study [J]. Annals of Surgical Treatment & Research, 2017, 92(4): 208-213

[18] Wei C, Zhang C, Wang G, et al. The feasibility and safety of thoracoscopic surgery under epidural and/or local anesthesia for spontaneous pneumothorax: a meta-analysis [J]. Videosurgery & Other Miniinvasive Techniques, 2017, 12(3): 216-224

[19] XIA Yanqiong, Deptof Anesthesiology. Comparative Analysis of the Volume Kinetics of Elderly Patients Under Epidural Block and General Anesthesia with Ringer's Lactate Solution Injection [J].Medical Journal of Wuhan University, 2017, 38(2): 317-319, 344

[20] Rath A, Abhinay J, Loha S, et al. A Case of Subclavian Artery Aneurysm with History of Ischemic Heart Disease Operated Under Cervical Epidural Anesthesia [J]. Anesthesia Essays & Researches, 2017, 11(1): 263-265

[21] Gerullis H, Ecke T H, Barski D, et al. Retrospective analysis of a surgical innovation using the IDEAL framework: radical cystectomy with epidural anaesthesia [J]. Journal of International Medical Research, 2017, 45(2): 714-722

[22] Pepe F, Stracquadanio M, Luca F D, et al. Epidural Anesthesia for Cesarean Section in a Pregnant Woman with Marfan Syndrome and Dural Ectasia [J]. Case Reports in Obstetrics and Gynecology,2017, (2017-5-22), 2017, 2017(5): 1-5

[23] Yoon H J, Do S H, Yun Y J. Comparing epidural surgical anesthesia and spinal anesthesia following epidural labor analgesia for intrapartum cesarean section: a prospective randomized controlled trial[J]. Korean Journal of Anesthesiology, 2017, 70(4): 412-419

(下转第 741 页)

hypertension: a longitudinal evolution with 4-year follow-up of a random clinical trial[J]. Clin Exp Hypertens, 2019, 41(1): 49-57

[18] Timóteo AT, Mota Carmo M, Soares C, et al. Has carotid intima-media thickness prognostic impact in patients with high cardiovascular risk? A long-term cohort study [J]. Echocardiography, 2019, 36(1): 125-132

[19] Franceschini N, Giambartolomei C, de Vries PS, et al. GWAS and colocalization analyses implicate carotid intima-media thickness and carotid plaque loci in cardiovascular outcomes [J]. Nat Commun, 2018, 9(1): 5141

[20] Osawa K, Trejo MEP, Nakanishi R, et al. Coronary artery calcium and carotid artery intima-media thickness for the prediction of stroke and benefit from statins [J]. Eur J Prev Cardiol, 2018, 25 (18): 1980-1987

[21] Ho SK, Wu YW, Tseng WK, et al. The prognostic significance of heart-type fatty acid binding protein in patients with stable coronary heart disease[J]. Sci Rep, 2018, 8(1): 14410

[22] Sonmez BM, Ozturk D, Yilmaz F, et al. Bedside heart type fatty acid binding protein (H-FABP): Is an early predictive marker of cardiac syncope[J]. J Pak Med Assoc, 2015, 65(11): 1156-1160

[23] Atay E, Guzel M, Amanvermez R, et al. Role of Gal-3 and H-FABP in the early diagnosis of acute coronary syndrome [J]. Bratisl Lek Listy, 2019, 120(2): 124-130

[24] Bivona G, Agnello L, Bellia C, et al. Diagnostic and prognostic value of H-FABP in acute coronary syndrome: Still evidence to bring [J]. Clin Biochem, 2018, 58(8): 1-4

[25] Zhuang L, Li C, Chen Q, et al. Fatty acid-binding protein 3 contributes to ischemic heart injury by regulating cardiac myocyte apoptosis and MAPK pathways[J]. Am J Physiol Heart Circ Physiol, 2019, 316(5): H971-H984

[26] Turan T, Agac MT, Aykan AÇ, et al. Usefulness of Heart-Type Fatty Acid-Binding Protein and Myocardial Performance Index for Early Detection of 5-Fluorouracil Cardiotoxicity [J]. Angiology, 2017, 68 (1): 52-58

[27] 黄赞鸿, 林英奎, 郑康鑫. 血清 H-FABP 联合 cTnI 诊断入院后胸痛 AMI 疑似病例的诊断价值[J]. 热带医学杂志, 2019, 19(1): 30-34

[28] Jirak P, Fejzic D, Paar V, et al. Influences of Ivabradine treatment on serum levels of cardiac biomarkers sST2, GDF-15, suPAR and H-FABP in patients with chronic heart failure[J]. Acta Pharmacol Sin, 2018, 39(7): 1189-1196

[29] Connolly M, Shand J, Kinnin M, et al. Heart-type fatty acid-binding protein (H-FABP) and highly sensitive troponin T (hsTnT) as markers of myocardial injury and cardiovascular events in elective percutaneous coronary intervention (PCI)[J]. QJM, 2018, 111(1): 33-38

[30] 郑丽, 朱宏英, 冯雪虹. EASI 导联与血清 H-FABP、IMA 联合检测在冠心病心肌缺血病人诊断中的意义 [J]. 海南医学院学报, 2018, 24(24): 2158-2161

(上接第 717 页)

[24] Tanaka H, Kamiya C, Katsuragi S, et al. Effect of epidural anesthesia in labor; pregnancy with cardiovascular disease[J]. Taiwanese Journal of Obstetrics & Gynecology, 2018, 57(2): 190-193

[25] Kiasari A Z, Babaei A, Alipour A, et al. Comparison of Hemodynamic Changes in Unilateral Spinal Anesthesia Versus Epidural Anesthesia Below the T10 Sensory Level in Unilateral Surgeries: a Double-Blind Randomized Clinical Trial [J]. Medical Archives, 2017, 71 (4): 274-279

[26] Bhandari R S, Bhatia R, Agrawal S. Epidural Volume Extension with Saline in Combined Spinal-Epidural Anesthesia for Hip Surgeries Using Low Dose of Intrathecal Hyperbaric Bupivacaine [J]. Anesthesia Essays & Researches, 2018, 12(1): 145-148

[27] Shields L E, Iyer V, Zhang Y P, et al. Acute cauda equina syndrome following orthopedic procedures as a result of epidural anesthesia[J]. Surgical Neurology International, 2018, 9(1): 81

[28] Beisenova A, Issatayeva A, Tosi D, et al. Fiber-optic distributed strain sensing needle for real-time guidance in epidural anesthesia[J]. IEEE Sensors Journal, 2018, PP(99): 1-1

[29] Bulte C S, Boer C, Hartemink K J, et al. Myocardial Microvascular Responsiveness During Acute Cardiac Sympathectomy Induced by Thoracic Epidural Anesthesia[J]. Journal of Cardiothoracic & Vascular Anesthesia, 2017, 31(1): S1053077016301616

[30] Xu Z, Shen F, Zhang Y, et al. Combined spinal-epidural anesthesia with hypobaric ropivacaine in sitting position significantly increases the incidence of hypotension in parturients undergoing cesarean section [J]. Journal of Obstetrics & Gynaecology Research, 2017, 43(4): 669