

medical therapy in helping people to return to normal activities. Our data indicate that CR program is feasible and effective in improving working capacity, exercise time and quality of life in patients with coronary artery disease.

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## References

1. Lavie CJ, Milani RV. Cardiac rehabilitation. In: Brown DC, editor. Textbook of cardiac intensive care. Philadelphia (PA): WB Saunders 1997; p. 1102-1107.
2. Wilson JR, Groves J, Rayos G. Circulatory status and response to cardiac rehabilitation in-patients with heart failure. *Circulation* 1996; 94: 1567-1572.
3. Hull SS Jr, Vanoli E, Adamson PB, Verrier RL, Foreman RD, Schwartz PJ. Exercise training confers anticipatory protection from sudden death during acute myocardial ischemia. *Circulation* 1994; 89: 548-552.
4. Schuler G, Hambrecht R, Schlierf G, Niebauer J, Hauer K, Neumann J et al. Regular physical exercise and low-fat diet: effects on progression of coronary artery disease. *Circulation* 1992; 86: 1-11.
5. Milani RV, Lavie CJ, Cassidy MM. Effects of cardiac rehabilitation and exercise training programs on depression in-patients after major coronary events. *Am Heart J* 1996; 132: 726-732.

## Thromboprophylaxis in laparoscopic cholecystectomy

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After its introduction in 1989, one of the advantages of laparoscopic cholecystectomy (LC) over the conventional method was low incidence of thromboembolic events due to early mobilization and lower surgical stress. This view was later tarnished by some reports of deep venous thrombosis (DVT) after laparoscopic procedures.<sup>1,2</sup> This was attributed to the fact that increased intraabdominal pressure induced by laparoscopic pneumoperitoneum causes inferior vena caval compression with subsequent impedance of venous return which leads to stasis and thrombosis.<sup>2</sup> However, this fact was refuted<sup>3</sup> resulting in great variation in attitudes of laparoscopic surgeons towards thromboprophylaxis during laparoscopic surgery.

A questionnaire was sent to 114 laparoscopic surgeons in 32 hospitals in all the 5 provinces in the Kingdom of Saudi Arabia (KSA) in January 2002. The questionnaire covered the number of LC performed per annum by each surgeon, selective or routine use of anticoagulants in elective LC, the number of thromboembolic cases diagnosed as DVT or pulmonary embolism (PE) following LC that was encountered by each surgeon and

the outcome. The answered questionnaire was collected and entered in a database and analyzed. Only 70 responses (61%) were received. Thirty (43%) of the respondents performed more than 75 LC per annum and only 3 surgeons performed less than 10 per year. Thirty-nine surgeons (56%) were selective in their thromboprophylaxis policy while 37 surgeons (38.5%) prescribed heparin routinely to all patients undergoing LC. Only 4 surgeons did not believe that anticoagulation was necessary in elective LC. Half of the respondents, mainly those working in the private sector, used low molecular weight heparin (LMWH) and the other half used unfractionated (standard) heparin. Thirty-eight surgeons (54%) used other anti-DVT measures such as elastic stockings. Fifty-nine (84.3%) surgeons did not encounter a single case of thromboembolism after LC in their practice. Eleven (15.7%) surgeons encountered 15 cases of thromboembolism. All affected patients were cured by anticoagulation except 2 who died of massive PE (Table 1). Surgeons adopting selective thromboprophylactic policy encountered 11 (73%) of the thromboembolic events.

The reported incidence of DVT after LC is 0.03-1%.<sup>1</sup> However, a much higher incidence of subclinical DVT following LC was reported.<sup>2</sup> Although recent papers, mostly as case reports, have addressed the risk of DVT after LC and the need for routine thromboprophylaxis, some authors still express doubts about its validity and cost-effectiveness for routine LC.<sup>3</sup> Therefore, controversy regarding thromboprophylaxis still exists among laparoscopic surgeons. In a review of 8 published original articles on LC from KSA from 1993-1999, that included 3488 patients, only 2 cases (0.07%) of DVT and 2 cases (0.07%) of PE were encountered giving a total thromboembolism rate of 0.14%; all were cured with anticoagulation without mortality. This is indeed very low and does not give a cause for concern. This survey however identified 15 thromboembolic events encountered by 11 surgeons (15.7%) in 9 departments (28%); one department with very high throughput of LC encountered 6 events (40%). All affected patients were cured by anticoagulation except 2 that died of massive PE. It is such mortality that needs to be avoided by aggressive thromboprophylaxis. Furthermore, surgeons adopting a selective policy on thromboprophylaxis experienced more than 70% of these events. This may be explained by the fact that the indications for selective use of thromboprophylaxis are so variable among the respondents. Furthermore, in absence of clear and specific guidelines, some patients may undergo laparoscopic surgery without DVT-prophylaxis, which makes them at an increased risk of developing DVT or PE. This variation in indications was also reported by similar studies from the United Kingdom (UK)<sup>4</sup> and Denmark.<sup>5</sup> In our survey, it was very disturbing to find that surgical members of the same department have different attitudes towards thromboprophylaxis. This

**Table 1** - Details of thromboembolic events and outcome in relation to use of heparin, other DVT-detering measures and number of LC per annum.

Surgeon's code	No. of events	Heparin use	Other measures	No. of LC per annum	Outcome
102*	1	Selective	Stockings	>75	Cured
71	1	Routine	Stockings	>75	Cured
17	1	Selective	None	>75	Dead
65	1	Selective	Stockings	>75	Cured
74	1	Selective	None	>75	Cured
102b*	1	Routine	None	>75	Cured
50	1	Selective	Stockings	51-75	Cured
53	2	Selective	Stockings	51-75	Cured
49	1	Selective	Stockings	26-50	Cured
73	1	Routine	Stockings	26-50	Dead
102a*	4	Selective	None	26-50	Cured
<b>Total</b>	<b>15</b>	<b>8 Selective, 3 Routine</b>	<b>7 Stockings, 4 none</b>	<b>6 &gt;75</b>	<b>2 Deaths</b>
DVT - deep vein thrombosis, LC - Laparoscopic cholecystectomy, * - surgeons practicing in the same department					

indicates an absence of common departmental protocols in most of the Saudi hospitals surveyed. In contrast, 93% of the surgical departments in Denmark have departmental protocols.<sup>5</sup> Routine use of thromboprophylaxis in the UK is higher (74%) than that practiced in Denmark (37%) or that practiced by Saudi surgeons in the present study (38.5%). Furthermore, the incidence of thromboembolic events in the UK study is lower than that of the Danish and the present surveys (9% versus 20% and 15.7%).

From this study and the UK and Danish study, 2 important facts emerge. First, lower incidence of thromboembolic events were encountered by the UK surgeons who are adopting higher routine use of heparin prophylaxis in LC. Second, more than 70% of the thrombotic events in this survey were encountered by surgeons adopting selective policy. These 2 facts indicate that routine heparin prophylaxis is superior to selective use of heparin in preventing DVT following LC.

The authors who perform >75 LC per annum have been employing a routine single dose policy for all patients undergoing LC over the past 11 years without encountering any clinical DVT or PE. For sickle cell disease patients who are undergoing LC, unlike most the respondents, heparin is continued postoperatively at a dose of 5000 units twice daily until the patient is fully ambulating. Sickle cell disease patients who have received preoperative exchange transfusion in an attempt to reduce sickle hemoglobin to less than 50%; a level at

which the vasoocclusive crises are less likely, are excluded from preoperative heparin thromboprophylaxis to avoid intraoperative bleeding and postoperative abdominal wall hematoma. However, other thromboprophylactic measures such as elastic compression stockings or pneumatic compression devices are employed during LC and heparin is started soon after surgery until full mobilization.

In conclusion, based on the authors experience, the findings of the current survey and the findings of the British and Danish surveys, the authors advocate routine thromboprophylaxis for all patients undergoing any laparoscopic abdominal procedure until further new recommendations based on prospective randomized trials emerge.

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## References

1. Catheline JM, Turner R, Gaillard JL, Rizk N, Champault G. Thromboembolism in laparoscopic surgery: risk factors and preventive measures. *Surg Laparosc Endosc Percutan Tech* 1999; 9: 135-139.
2. Patel M, Hardman DT, Nicholls D, Fisher CM, Appleberg M. The incidence of deep venous thrombosis after laparoscopic cholecystectomy. *Med J Aust* 1996; 164: 652-656.

3. Bais JE, Schiereck J, Banga JD, van Vroonhoven TJ. Resistance to venous outflow during laparoscopic cholecystectomy and laparoscopic herniorrhaphy. *Surg Laparosc Endosc* 1998; 8: 102-107.
4. Bradbury AW, Khan YC, Darzi A, Stansby GS. Thromboembolism prophylaxis during laparoscopic cholecystectomy. *Br J Surg* 1997; 84: 962-964.
5. Filtenborg T, Rasmussen MS, Wille-Jørgensen P. Survey of the use of thromboprophylaxis in laparoscopic surgery in Denmark. *Br J Surg* 2001; 88: 1413-1416.

abdomen was opened; there was a perforated appendix with generalized peritonitis. Postoperatively the child did well, and was discharged home after 10 days.

Nothing can replace a careful clinical evaluation. With improved attention to the early prodromal symptoms and astute diagnosis by an experienced surgeon we can decrease the incidence of undetected appendicitis and its complications.<sup>2</sup> The presence of a painful irreducible groin swelling makes it difficult for the surgeon to entertain any other diagnosis although the presence of an abdominal pain preceding the swelling may give a clue to the correct diagnosis.<sup>3</sup> There are 2 phases of this condition: an early phase due to the distension of a hernia sac or a patent processus vaginalis with pus as in our case, and a delayed phase where the contamination of the sac occurs yet the clinical features appear after 3-9 days when a scrotal abscess develops.<sup>3-5</sup> A peritoneal wash may encourage the passage of micro-organisms down a patent processus vaginalis. From the natural history of abdominal hernias, we can expect that such a complication is more associated with an inguinal hernia, more among male patients and more on the right side.

In conclusion, an early diagnosis and operative intervention in the pediatric age group is indispensable, increased level of competence of the doctors on duty can lower the number of missed appendicitis. Despite the above rare pathology, we have to think of in cases of perforated appendix with history of a hernia or hydrocele.

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## References

1. Lin YL, Lee CH. Appendicitis in infancy. *Pediat Surg Int* 2003; 19: 372-379.
2. Neuspiel DR, Kuller IH. Fatalities from undetected appendicitis in early childhood. *Clin Pediatr (Phila)* 1987; 26: 573-575.
3. Cronin K, Ellis H. Pus collection in a hernia sac, an unusual complication of generalized peritonitis. *Br J Surg* 1959; 46: 346-367.
4. Shahrudin MD. Scrotal abscess an unusual complication of perforated appendix. *Med J Malaysia* 1994; 49: 172-173.
5. Inchtman M, Kirschon M, Feldman M. Neonatal pyoscotum and perforated appendix. *J Perinatol* 1999; 19: 536-537.

## An unusual presentation of perforated appendicitis

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The most common intra peritoneal viscus to be perforated in the pediatric age group is the appendix. Appendicitis is very rare in infants and toddlers; its protean manifestations in early childhood are puzzling to the clinician and a major factor in delaying the diagnosis. This can lead to an increased incidence of advanced appendicitis,<sup>1</sup> and offers a favorable chance for the development of this exceptional and rare complication of perforated appendicitis. Pus like any other intra peritoneal fluid; for example, blood, ascites, meconium, and can be collected in any peritoneal recess, but for a hernial sac or a patent processus vaginalis to be full with pus after perforated appendicitis is extremely rare.

Herein, a 3-year old male child was referred to our department from a district hospital with a history of painful inguinal lump of one day duration associated with vomiting and abdominal distension. The family gave a history of abdominal pain, vomiting, diarrhea and fever 2 days before treated as gastroenteritis. On examination the patient looked ill, pale, with high fever (39°C). There was generalized abdominal tenderness, guarding, and bowel sounds were sluggish, associated with a tender, firm, irreducible swelling at the left inguinal region with a red overlying skin, there was no history of a hernia and both testes were palpable in the scrotum. He had a high leukocytes count (18,000/mcl), multiple fluid levels on plain x-ray of the abdomen, no gas shadow was seen at the left groin. The patient was diagnosed to have a strangulated left inguinal hernia, per-operatively the left sac was found full of pus with severe inflammation of the surrounding tissues. After evacuation of the pus and excision of the sac, the