Brief Communication

Acceptance of C-FLEX therapy in patients with obstructive sleep apnea who refused auto-continuous positive airway pressure

Suhaila Al-Jawder, MD, MRCP,
Ahmed BaHammam, FRCP, FCCP.

Continuous positive airway pressure (CPAP) is the standard treatment for obstructive sleep apnea (OSA).[1] Different modalities of CPAP are available aiming to improve patients' acceptance and compliance, including the conventional CPAP, auto-CPAP (APAP), bi-level positive airway pressure (bi-level PAP) and flexible CPAP or flexible pressure release CPAP (C-FLEX). Flexible pressure release CPAP is a new algorithm designed to reduce pressure during expiration to give the patient a feeling of comfort. Reducing pressure during exhalation while still providing adequate pneumatic splint may improve patients' tolerance. This decrease in expiratory pressure depends on the expiratory flow, and it occurs at the beginning of expiration with the intention to relieve patient's feeling of exhaling against high pressure. One of the major issues with CPAP is patients' acceptance and compliance. The duration of nocturnal use has been estimated to be from 3.9 hour to 6.5 hour per night over the long-term.[2] Among Saudi patients, a recent preliminary report showed that 27.5% of females and 9.1% of males with OSA refused to try CPAP titration in the Sleep Disorders Center (SDC) at the University Hospital due to the high air flow and pressure.[3] The acceptance of the conventional CPAP seems to be less than the other newly modified CPAP. Konermann et al[4] and Meurice et al[5] showed that the duration of APAP usage increased by 0.8 hour and 1.4 hour respectively compared to the conventional CPAP.[4,5] Nevertheless, we still face patients who refused titration trial in SDC due to high air flow. Very limited number of studies with small number of patients have explored the adherence to C-FLEX therapy in patients with OSA and had shown encouraging results.[2,6-8] However, no study has explored the utility of C-FLEX therapy in patients who refused titration trials of APAP in the SDC.

We report 6 patients (4 males and 2 females) with a mean age of 49 ± 5.8 years, body mass index of 32.6 ± 9.4 kg/m^2 and Epworth sleepiness scale (ESS) of 13 ± 7.6. They were diagnosed to have severe OSA based on the attended polysomnography (PSG) in the SDC of King Khalid University Hospital between December 2006 and March 2007. The study was approved by the Ethical Committee.. The apnea-hypopnea index (AHI) was 52.6 ± 32 hour. All patients underwent a trial of APAP titration in the SDC under PSG monitoring. One patient terminated the titration trial as he could not exhale against the high expiratory pressure. The remaining 5 patients continued the trial but could not tolerate the pressure required to eliminate apneas and hypopneas. At the end of the titration, all 5 patients expressed that they will never use CPAP again, mostly due to the difficulty they experienced during exhalation against the machine. A daytime training for CPAP was given to all patients followed by 2 titration trials in 2 different nights. In a random order, APAP or APAP with C-FLEX (REM Star Auto, Respironics, Murrysville, PA, USA) was used for patients during the 2 follow up studies. The same titration protocol was used for both CPAP modalities and patients were blinded to the machine used. While the second APAP titration trial failed, all patients accepted C-FLEX and the optimal pressure that eliminated apneas and hypopneas was determined.

Table 1 presents the PSG findings at baseline, on APAP and on C-FLEX. AHI, desaturation index and arousal index were significantly lower during C-FLEX compared to APAP. All the 6 patients preferred to use C-FLEX at home. These preliminary data demonstrate that the acceptance of C-FLEX therapy during titration could be better than APAP. Flexible pressure release CPAP therapy seems to be a good alternative in patients

Table 1- Patient's parameters at baseline, on APAP and on C-FLEX.

Variable	Baseline	APAP	C-FLEX	*P*-value†
Sleep efficiency %	64 ± 9.2	76.8 ± 9.8	88.8 ± 6.3	p<0.001
Apnea/hypopnea index	52.6 ± 32	13.6 ± 21	4.8 ± 4.3	p=0.01
Lowest oxygen saturation (%)	75 ± 15.8	86.8 ± 8	88.5 ± 8	Not significant
Desaturation index	36 ± 34.8	13.8 ± 14.4	2.5 ± 1	p=0.02
Arousal index	79.3 ± 30.5	37.6 ± 28.2	20 ± 11.6	p=0.008
CPAP pressure (cm$H_2$0)		11.2 ± 4	9.8 ± 3	Not significant

*Values are expressed as mean ± SD, †*p*-value represents the difference between auto-positive airway pressure (APAP) and flexible pressure release CPAP (C-FLEX). CPAP - continuous positive airway pressure

with OSA who refused to use APAP or conventional CPAP. Large randomized studies are needed to assess the acceptance rate of C-FLEX therapy during the initial titration compared to other CPAP modalities.

Received 16th April 2007. Accepted 2nd July 2007.

From the Sleep Disorders Center, Department of Medicine, College of Medicine, King Saud University, Riyadh, Kingdom of Saudi Arabia. Address correspondence and reprint requests to: Prof. Ahmed Bahammam, Sleep Disorders Center, Department of Medicine, College of Medicine, King Saud University, PO Box 225503, Riyadh 11324, Kingdom of Saudi Arabia. Tel. +966 (1) 4671521. Fax. +966 (1) 4672558. E-mail: ashammam2@yahoo.com

References

1. Indications and standards for use of nasal continuous positive airway pressure (CPAP) in sleep apnea syndromes. American Thoracic Society. Official statement adopted March 1944. ***Am J Respir Crit Care Med*** 1994; 150 (6 Pt 1): 1738-1745. Erratum in: ***Am J Respir Crit Care Med*** 1995; 151 (2 Pt 1): 578.
2. Nilius G, Happel A, Domanski U, Ruhle KH. Pressure-relief continuous positive airway pressure vs constant continuous positive airway pressure: a comparison of efficacy and compliance. ***Chest*** 2006; 130: 1018-1024.
3. Al-Otair H, BaHammam A. Gender differences in obstructive sleep apnea among Saudi subjects. The 5th Annual Scientific Conference of Saudi Thoracic Society Jointly with the 26th Regional meeting of the International Union Against Tuberculosis and Lung Disease (IUATLD), & Recent advances in respiratory care symposium. 2007 March 20-22; Riyadh, Kingdom of Saudi Arabia.
4. Konermann M, Sanner BM, Vyleta M, F Laschewski F, Groetz J, Sturm A et al. Use of conventional and self-adjusting nasal continuous positive airway pressure for treatment of severe obstructive sleep apnea syndrome. ***Chest*** 1998; 113: 714-718.
5. Meurice JC, Marc I, Series F. Efficacy of auto-CPAP in the treatment of obstructive sleep apnea/hypopnea syndrome. ***Am J Respir Crit Care Med*** 1996; 153: 794-798.
6. Aloia M, Stanchina M, Arnedt T, Malhotra A, Millman R. Treatment Adherence and Outcomes in Flexible vs. Standard Continuous Positive airway pressure Therapy. ***Chest*** 2005; 127; 2085-2093.
7. Mulgrew AT, Cheema R, Fleetham J, Ryan CF, Ayas NT. Efficacy and patient satisfaction with auto-adjusting CPAP with variable expiratory pressure vs. standard CPAP: a two-night randomized crossover trial. ***Sleep Breath*** 2007; 11: 31-7.
8. Kaluza I, Rauscher H, Herle M, Zwick H. Compliance of CPAP-therapy vs. CFLEX therapy and convenience for patients (abstract). ***Sleep Med*** 2006; 7: S78.

Outcome of ileal pouch-anal anastomosis for familial adenomatous polyposis

Munir A. Rathore, *FCPS, FRCS,*
Syed-Imran H. Andrabi, *FCPS, FRCS,*
Roy J. Maxwell, *MD, FRCS.*

Familial adenomatous polyposis (FAP) is an uncommon autosomal dominant condition characterized by the presence of hundreds of polyps in the large bowel and associated with an almost 100% risk of colorectal carcinoma developing at a young age. It results from a mutation in the adenomatous polyposis coli (APC) gene on chromosome 5q. The aim of surgical management is to offer prophylactic colectomy before cancer occurs. Total proctocolectomy and ileostomy leave the patient with a permanent stoma. Abdominal colectomy and ileorectal anastomosis has low morbidity and good functional results, but leaves mucosa at risk requiring close follow up and, ultimately, rectal excision. Ileal pouch-anal anastomosis (IPAA) removes all mucosa at risk and avoids a permanent stoma, but has a higher operative morbidity. Ileal pouch-anal anastomosis, sometimes known as restorative proctocolectomy, involves removal of the colon and rectum. The mucosa is stripped from the distal rectum leaving the anal sphincter mechanism intact. A reservoir (J-pouch) is constructed from terminal ileum and anastomosed to the anus at the dentate line. A loop ileostomy is made to defunction the pouch, usually for 3 months. Quality of life (QOL) scores after IPAA are reported as good.[1] However, the QOL instrument is a global assessment. This paper addresses specifically, stool frequency and continence.

This study was carried out at the Department of Colorectal Surgery, Royal Victoria Hospital, Belfast, United Kingdom. Ethical approval was not applicable. The case notes of all the patients who had IPAA carried out for FAP by a single surgeon between 1987 and 2005 were reviewed. No patients were excluded. One-sample t-test was used to calculate the *p*-value (significant at 0.05). Twenty one consecutive patients were reviewed. The mean age at operation was 24 years (14-39). There were 12 males. One case was sporadic and the remaining 4 were known as FAP kindreds. Eight patients (38%) were asymptomatic. Of the 13 who had symptoms, 7 had rectal bleeding alone, 4 had rectal bleeding and diarrhea and 2 had rectal bleeding, diarrhea and abdominal pain. One patient had duodenal adenoma. Two patients had high grade dysplasia in the colorectal tubulo-villous adenomas. One patient had a pT3N2M0 recto-sigmoid carcinoma at presentation. She has had prolonged chemotherapy and her ileostomy has not yet been closed. **Table 1** shows the functional results at 6-12 months following ileostomy closure for the other 20 patients. The functional results have remained remarkably stable for individual patients at a mean follow up of 74 months. One patient died in a motor accident. At the time of reporting, the remaining 20 patients are alive and under follow up. The frequency had a range of 3-9 stools /24 hours with a mean of 4.6 (SD=1.62 SE=0.39), median 4 (iqr=4-5) and mode of 4. Fifteen out of 20 (75%) had a stool frequency <5/24 hours. The difference was statistically (and clinically) significant if compared with the (hypothetical mean) upper limit of normal bowel frequency of 3x/24 hours (p=0.0007).

Table 1 - The functional results of ileal pouch-anal anastomosis.

Stool frequency/24 hours	n	(%)
Frequency ≤5/24 hours	15/20	(75)
Night stool (≤2)	3/20	(15)
Night stool >2	1/20	(5)
Good continence	19/20	(95)
Stenosis of pouch-anal anastomosis requiring dilatation	1/21	(5)
Mean = 4.6 (range -9)		

The difference between actual and hypothetical means was 1.65 (confidence interval: 0.82-2.48). Thus, whilst IPAA may avoid a permanent stoma, it does not quite restore normal bowel function. There were significant late complications. Two patients required laparotomy for adhesive small bowel obstruction. Two young female patients from the same kindred developed mesenteric desmoids at 14 and 48 months following pouch surgery. One of these suffered a related small bowel perforation requiring a proximal stoma and resulted in short bowel syndrome. One patient had an abdominal wall desmoid tumor excised with no recurrence after 12 years. This patient had a strangulated internal hernia or volvulus requiring resection of a significant amount of small bowel and reversion to a permanent stoma. The principal advantage of IPAA over alternative procedures for FAP is that all at-risk large bowel mucosa is removed without the need for a permanent stoma. The procedure was originally devised for the treatment of ulcerative colitis which remains its most common indication. However, it is generally accepted that the functional results of IPAA are better in FAP. Furthermore, the incidence of some complications including pelvic sepsis and pouchitis are less in FAP patients. Various studies from other specialist units have shown a mean stool frequency of 4-4.2 /24 hours[2-4] although it has been reported as high as 7.5x /24 hours in a series of 30 patients from Lahey Clinic, Mass USA.[1] Ileorectal anastomosis resulted in a mean frequency of 3 and 3.6 /24 hours[3,5] in series of 51 and 23 patients respectively. This is a significant difference statistically (p=0.0007 to 0.0168) and clinically. With improved recognition and treatment of the large bowel polyps in FAP, the main cause of FAP related mortality is now called as upper gastrointestinal cancer and desmoid disease. Desmoids are fibromatous masses which become locally invasive and cause obstruction of the ureters and of the small bowel and its blood supply. Surgery appears to contribute to the development of desmoid disease in some patients. Perforation which occurred in one of our patients is a well-recognized complication. This series showed good functional results with good continence and a mean stool frequency of 4.6x/24 hours. There was, however, significant late morbidity resulting both from the operation of IPAA and from FAP related factors, particularly desmoid disease.

Received 21st January 2007. Accepted 13th August 2007.

From the Department of Colorectal Surgery, Royal Victoria Hospital, Belfast, United Kingdom. Address correspondence and reprint requests to: Dr. Munir A. Rathore, Department of Colorectal Surgery, Royal Victoria Hospital, 23 Wallace Avenue, Lisburn BT27 4AE, Northern Ireland, United Kingdom. E-mail: munirrathore@yahoo.com

References

1. Ko CY, Rusin LC, Schoetz DJ Jr, Moreau L, Coller JA, Murray JJ, et al. Does better functional result equate with better quality of life? Implications for surgical treatment in familial adenomatous polyposis. ***Dis Colon Rectum*** 2000; 43: 829-835.
2. Parc YR, Moslein G, Dozois RR, Pemberton JH, Wolff BG, King JE. Familial adenomatous polyposis: results after ileal pouch-anal anastomosis in teenagers. ***Dis Colon Rectum*** 2000; 43: 893-898.
3. Kartheuser AH, Parc R, Penna CP, Tiret E, Frileux P, Hannoun L, et al. Ileal pouch-anal anastomosis as the first choice operation in patients with familial adenomatous polyposis: a ten-year experience. ***Surgery*** 1996; 119: 615-623.
4. Nyam DC, Brillant PT, Dozois RR, Kelly KA, Pemberton JH, Wolff BG. Ileal pouch-anal canal anastomosis for familial adenomatous polyposis: early and late results. ***Ann Surg*** 1997; 226: 514-519.
5. Church JM, Fazio VW, Lavery IC, Oakley JR, Milsom J, McGannon. Quality of life after prophylactic colectomy and ileorectal anastomosis in patients with familial adenomatous polyposis. ***Dis Colon Rectum*** 1996; 39: 1404-1408.

A novel method for reprogramming somatic cells into embryonic stem cells

Walid E. Maalouf, *MMedSc, PhD.*

Stem cells are the body's 'master' cells, they are pluripotent cells, and in theory, they can potentially be differentiated to any tissue-type in the body. In general, 3 categories of stem cells exist: adult stem cells, which can be derived from adult tissues; cord blood stem cells, which are isolated from the umbilical cord; and embryonic stem cells, which are derived from the embryo. Until today, stem cells have been mostly derived from the totipotent cells of the inner cell mass (ICM) of mouse and human blastocysts. The ability of a differentiated somatic cell to switch into a pluripotent cell has puzzled researchers for several years.

It was not until exactly 10 years ago, when Dolly the sheep was born,[1] that scientists accepted the fact that somatic cells can be reprogrammed into an embryonic totipotent state. Dolly was created after the transfer of a differentiated mammary gland cell nucleus into a donor oocyte which reversed the somatic program into an embryonic one, and developed to give rise to a live offspring. Ten years after Dolly, an embryo-free alternative method for the derivation of stem cells has now been proven possible. In recent original research by Okita et al[2] of Kyoto University, mouse skin cells were de-differentiated into an embryonic state by a simple retroviral introduction of 4 genes that code for specific proteins known as transcription factors, namely Oct3/4, Sox2, c-Myc and Klf4. The resulting cells were termed induced pluripotent cells or simply iPS cells. They carry analogous expressed markers (Oct4, Nanog, Sox2 and Fbx15) and chromatin modifications (DNA CpG dinucleotides, histone H3 lysine 4 and histone H3 lysine 27 methylation). In addition, iPS cells can multiply indefinitely in culture, while maintaining their pluripotent state, similarly to existing stem cells derived from embryos. In addition, iPS cells were selected according to their Nanog expression, which is a target of Oct3/4 and Sox2. This was different to what they previously carried out in the same laboratory[3] when they selected iPS cells according to their Fbx15 expression (another target of Oct3/4 and Sox2), which caused the limitation in the isolation of these cells at that time. The selected cells were tested for their ability to produce adult chimaeric mice by injecting them into blastocysts, which were then transplanted into the uteri of pseudo-pregnant surrogates. Simple sequence length polymorphism (SSLP) was used to demonstrate the contribution of these cells to various organs including the testes. The germ line transmission was then tested by crossing the resulting chimaeric mice for a second generation with limited success. The work by Okita et al[2] underwent severe scrutiny after the irreproducible (later fraudulent) work by Hwang et al[4] claiming to have innovatively derived of embryonic stem cells from human cloned embryos. However, the replication of Okita et al's results by Wernig et al[5] from the Whitehead Institute of Biomedical Research in Cambridge, Massachusetts, as well as Maherali et al[6] with the joint effort between of the Harvard Stem Cell Institute in Boston, Massachusetts and the University of California, Los Angeles, corroborated the work of the Japanese team. The derivation of stem cells, without the need for eggs, sperm, or embryos, is the great prize for stem cell research. In theory, one can speculate that individual's iPS cells can be propagated in the laboratory and differentiated into any type of cell in the body. But of course, the method is still far from perfect, and there is a high dose of scepticism surrounding it. The reprogramming of cells is inefficient, with only less than 0.1% of skin cells that will be fully reprogrammed. As in most gene knock-in experiments, antibiotic resistance genes are inserted along the genes of interest. The cells are then supplemented with antibiotics to destroy non-transfected cells. The major drawback of these experiments is the increased activation of tumor-causing genes such as the reactivation of c-Myc in the current studies. This de-regulation of certain factors can be the result of the utilization of retroviruses as a method of transfecting cells, which introduce genes at random locations in the genome. It is worth noting that the deregulation of a number of other factors were reported to affect normal growth and development such as Oct3/4,[7] Igf2 and Igf2r,[8] and others. A thorough understanding of the molecular pathways that dictate this reprogramming is needed. Alternative methods have already been suggested such as the replacement of the retrovirus by an adenovirus system for transient expression, and as Alan Trounson of Monash University said: "I can think of a dozen experiments right now and they were all good ones".[9] These findings have been particularly welcomed in the quarters where the use of embryos for research is ethically opposed. Moreover, fellow researchers and the public are already speculating on the application of these methods for human cell-therapy and treatment of diseases and disabilities such as Parkinson's disease, Alzheimer, Type 1 diabetes, strokes, and spinal cord injury. The use of these iPS cells in human therapy requires a long extensive research, in particular, until scientists manage to control the tumor formation incidence of these cells.[10] Therefore, whether embryonic or somatic, the race is still on for the ultimate method and the ultimate cells that will be employed in clinical medicine.

Received 2nd July 2007. Accepted 4th November 2007.

From the Department Biologie II, Ludwig Maximilians University of Munich, Planegg-Martinsried, Germany. Address correspondence and reprint requests to: Dr. Walid E. Maalouf, Department Biologie II, Ludwig Maximilians University of Munich, Grosshaderner Str. 2, 82152 Planegg-Martinsried, Germany. Tel. +33 (0) 134652792. Fax. +33 (0) 134652909. E-mail: walid.maalouf@jouy.inra.fr

References

1. Wilmut I, Schnieke AE, McWhir J, Kind AJ, Campbell KH. Viable offspring derived from fetal and adult mammalian cells. ***Cloning Stem Cells*** 2007; 9: 3-7.
2. Okita K, Ichisaka T, Yamanaka S. Generation of germline-competent induced pluripotent stem cells. ***Nature*** 2007; 448: 313-317.

3. Takahashi K, Yamanaka S. Induction of pluripotent stem cells from mouse embryonic and adult fibroblast cultures by defined factors. ***Cell*** 2006; 126: 663-676.
4. Hwang WS, Roh SI, Lee BC, Kang SK, Kwon DK, Kim S, et al. Patient-specific embryonic stem cells derived from human SCNT blastocysts. ***Science*** 2005; 308: 1777-1783.
5. Wernig M, Meissner A, Foreman R, Brambrink T, Ku M, Hochedlinger K, et al. In vitro reprogramming of fibroblasts into a pluripotent ES-cell-like state. ***Nature*** 2007; 448: 318-324.
6. Maherali N, Sridharan R, Xie W, Utikal J, Eminli S, Arnold K, et al. Directly Reprogrammed Fibroblasts Show Global Epigenetic Remodeling and Widespread Tissue Contribution. ***Cell Stem Cell*** 2007; 1: 55-70.
7. Hochedlinger K, Yamada Y, Beard C, Jaenisch R. Ectopic expression of Oct-4 blocks progenitor-cell differentiation and causes dysplasia in epithelial tissues. ***Cell*** 2005; 121: 465-477.
8. Smith FM, Garfield AS, Ward A. Regulation of growth and metabolism by imprinted genes. ***Cytogenet Genome Res*** 2006; 113: 279-291.
9. Cyranoski D. Simple switch turns cells embryonic. ***Nature*** 2007; 447: 618-619.
10. Yamanaka S. Strategies and New Developments in the Generation of Patient-Specific Pluripotent Stem Cells. ***Cell Stem Cell*** 2007; 1: 39-49.

Treatment outcome of tuberculosis patients diagnosed with human immunodeficiency virus infection in Iran

Payam Tabarsi, *MD, MPH,* ***Parvaneh Baghaei,*** *MD,*
Mehdi Mirsaeidi, *MD, MPH,* ***Majid Amiri,*** *MD, MPH,*
Narges Alipanah, *BS,* ***Habib Emami,*** *PhD,*
Atieh Novin, *BS,* ***Davood Mansouri,*** *MD, MPH,*
Mohammad R. Masjedi, *MD,* ***Ali A. Velayati,*** *MD.*

Tuberculosis-human immunodeficiency virus (TB-HIV) co-infection still poses a dilemma to the medical community by affecting half a million cases worldwide and causing 10% of all adult acquired immune deficiency syndrome (AIDS)-related deaths each year.[1] In the 1980s, the incidence of tuberculosis had decreased significantly worldwide; however, with the emergence of HIV as a prominent infection, TB incidence rose once again. Thus it is suggested that HIV infection may have an indirect effect on the incidence of TB by increasing the rate of transmission of Mycobacterium tuberculosis.[2] Concomitant treatment of TB-HIV patients is fraught with difficulties. At low CD4 counts, these patients are at an increased risk of progression and mortality as well as side effects due to therapy. The occurrence of TB in HIV-positive patients also increases the risk of acquiring further opportunistic infections and thus contributes to the high mortality rate among these patients. The use of highly active anti-retroviral therapy (HAART) on TB-HIV patients causes significant reductions in viral load, AIDS defining illness (ADI), and mortality, as well as decreasing the risk of developing TB by 70-90%. The present research was conducted as a retrospective cohort study on TB-HIV cases admitted to the Masih Daneshvari Hospital, the national referral center for TB and lung diseases in Tehran in the years 2002-2004 and who had a one-year follow-up. The purpose of this study is to describe the survival of TB-HIV patients, and to assess the treatment outcome in TB-HIV cases at the hospital.

All 1,050 TB patients that were admitted to the hospital between the years 2002-2004 were tested for HIV infection using the ELISA and Western Blot. Fifty-six patients were HIV-positive and were included in the study. We included 61 factors in the analysis that were considered significant in the treatment outcome of the TB-HIV patients such as age, gender, drug and opium use, method of transmission, incarceration, adverse effects, and ADI. Treatment outcome was divided into 3 categories: cure, death, and lost to follow-up. Acquired immune deficiency syndrome defining illnesses consisted of Cerebral Toxoplasmosis, Cytomegalovirus (CMV) Retinitis, CMV Pneumonitis, Cryptococal meningitis, and pneumocystis carini pneumonia. Since oral candidiasis is a sign of severe immune deficiency, therefore, for the purpose of this study, oral candidiasis is also categorized as an ADI. The information needed was procured from the files of these patients at the hospital. Hepatitis B and C serological tests, venereal disease research laboratory (VDRL), serology of toxoplasmosis (IgM, IgG), sputum smear and culture, antibiogram, and stool exam (S/E) were performed. When necessary, brain and lung CT scans, retinoscopy, and cerebrospinal fluid (CSF) analysis were also carried out. The CD4 count of the 56 patients was measured (Becton-Dikinson) and a chest x-ray was taken from them. The standard TB regimen, treatment with Isoniazid, Rifampin, Pyrazinamide, Ethambutol, and Vitamin B6, was administered for all these patients. The patients that developed adverse effects due to treatment received a modified treatment regimen with an extended duration of up to one year. The patients that were not intravenous drug users (IVDU), had good compliance, and had a CD4 count less than 200 were administered HAART starting from the fourth to eighth weeks of TB treatment. Based on national guidelines, HAART regimen was consisted of Zidovudine, Lamivudine, and Nelfinavir. The patients for whom HAART was necessary based on the mentioned criteria, received Rifabutin (150 mg/day) instead of Rifampin 2 weeks prior to initiating HAART.

The χ^2 (chi square) test was utilized to compare categorical data. Kaplan Meyer analysis was conducted on the survival analysis of the patients. All calculations

were performed using the SPSS version 11.5. Of the 56 TB-HIV patients included in the study, 53 were male. Most of the patients (89.3%) did not know that they were HIV-positive until tested in the hospital. The mean age of the patients was 37 ± 8 years. Intravenous drug use was the most common method of HIV transmission (75%), 54 cases (96.4%) were regular smokers, and 51 patients (91.1%) consumed opium (oral and inhaled). Fifty patients (89.3%) had a history of incarceration. Of the 56 patients in the sample, 32 (57.1%) had pulmonary TB, 6 cases (10.7%) had pleural TB, and 18 (32.1%) patients had both pulmonary and extrapulmonary TB (4 lymphnodes, 9 pleural, one anal, 2 pricarditis, one liver, and one abdominal). Sputum smear results were positive in 39 cases (69.6%) while culture results were positive in 33 cases (58.9%). Among the patients, 13 (23.2%) were receiving HAART. The mean CD4 count at which patients started HAART was 137 ± 32 while the median was 120. For the purpose of analysis, CD4 count was divided into 2 categories of less than 100 and greater or equal to 100: 19 cases (33.9%) belonged to the former while the rest (53.6%) belonged to the latter. Hepatitis B virus was detected in 4 cases (7.1%) while 45 cases (85.4%) had hepatitis C virus. Thirty-seven (66.1%) patients had ADI. The most common illness was oral candidiasis that was detected in 34 cases (60.7%). Toxoplasmosis was detected in 5 cases (8.9%). Two cases were diagnosed with CMV retinitis while one case had CMV pneumonitis. The *Pneumocystis carinii pneumonia* was found in one case and criptococal infection in 2 cases. There were also 2 cases of HSV while there were no cases of syphilis. Fifty percent of the cases were cured while mortality occurred in 15 cases (26.8%). Thirteen cases (23.2%) were lost in follow-up. Six (10.7%) patients died in the first 2 months of TB treatment while 3 died (5.4%) between 2-6 months. Three other cases died after 6 months of treatment with one death (1.8%) occurred at the twelfth month of follow-up. Thirteen (23.2%) patients developed adverse effects. Hepatitis was the most common AE that was detected in 8 cases followed by skin rash in 5 cases, and CNS and hematological problems each in one case. The rate of mortality was higher in ADI cases: 35.1% mortality in the ADI group and 10.5% in the non-ADI group (p<0.05). More death was occurred among patients with CD4 count <100 than the patients with CD4 ≥100 (42.1% versus 16.7%) (p<0.05) (**Figure 1**). The mean CD4 count was 193 ± 181 and the median was 128 while the average CD4 count at which death occurred was 127.8 ± 41. Mortality versus follow-up period revealed 50% of deaths during the first 4 months of treatment with the mean at 6.11 months. A cross tabulation of HAART and mortality did not yield significant results (p≥0.05). An analysis of the rate of mortality in patients who developed adverse effects showed that a higher percentage of patients who had AE died (38.5%) than the patients who did not die (23.3%) yet this result was not significant (p-value 0.278).

Studies show that HIV-infected patients experience high mortality during and following treatment of TB.[3] However, in this study, 50% of deaths occurred in the first 4 months of TB treatment which is equivalent to 13.4% of all TB-HIV patients in the study and a total of 26.8% of our cases died at the end of the follow up period. Other studies have shown that the use of HAART on TB-HIV patients causes significant reductions in mortality, it can be suggested that starting HAART early on can reduce the number of deaths by increasing the capacity of the immune system and decreasing the risk of acquiring opportunistic infections.[4] In an unpublished, 2 year follow-up study in Iran, the rate of mortality among newly diagnosed cases of non-HIV TB patients was reported to be 3.5%, significantly less than the 26.8% mortality rate in the TB-HIV group of the present study. Some studies have stated that most of the deaths in TB-HIV cases occur in patients who have never received HAART or who have started in few months prior to death. The present study also confirmed this since the 13 cases who were receiving HAART started treatment so late that it did not affect their rate of survival. The mean CD4 count at which patients started HAART was 137 ± 32 while the median was 120. In the present study, 16.1% of patients died before the standard TB regimen period of 6 months concluded. It should be noted that many patients in our study had progressive immunodeficiency

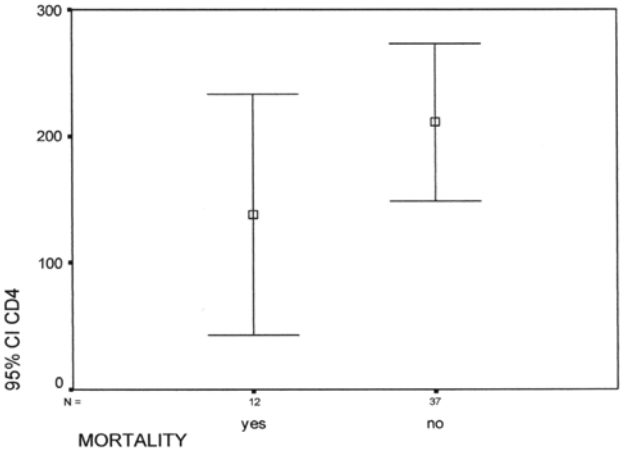

Figure 1 - Error bar graph of CD4 count versus mortality with 95% confidence interval.

and several simultaneous ADI. It should also be taken into consideration that this study was conducted in a referral center that could result in a less representative sample with patients in more chronic conditions. Another significant result of this study is the evident increase in mortality rate among patients who developed ADI. Considering the low CD4 count in these patients, it can be inferred that TB infection among HIV positive cases reduces their chance of survival while it increases the likelihood of acquiring other opportunistic illnesses. Although the present study found that the rate of mortality was higher among patients who had adverse drug reaction, this result was not statistically significant. Yet other studies have also demonstrated similar results in HIV-positive patients (18-39%). Moreover, some of these adverse effects could affect adherence, an essential factor in the treatment of HIV. Mortality rate among TB-HIV patients in this study is high. The incidence of ADI and the high rate of mortality in the first 4 months treatment indicate an evident need for treatment interventions, especially HAART.[5] The small sample size of this study, as well as the fact that it was conducted in a referral center, limit the significance of the results and call for further research in this field.

Received 10th April 2007. Accepted 4th November 2007.

From the Mycobacteriology Research Center, NRITLD Masih Daneshvari Hospital, Shahid Beheshti University of Medical Sciences, Tehran, Iran. Address correspondence and reprint requests to: Dr. Payam Tabarsi, Mycobacteriology Research Center, NRITLD Massih Daneshvari Hospital, Darabad, Niavaran, Tehran, Iran. E-mail: tabarsi@nritld.ac.ir

References

1. Corbett EL, Watt CJ, Walker N, Maher D, Williams BG, Raviglione MC, et al. The growing burden of tuberculosis: global trends and interactions with the HIV epidemic. ***Arch Intern Med*** 2003; 163: 1009-1021.
2. Sonnenberg P, Glynn JR, Fielding K, Murray J, Godfrey-Faussett P, Shearer S. HIV and pulmonary tuberculosis: the impact goes beyond those infected with HIV. ***AIDS*** 2004; 18: 657-662.
3. Maher D, Harries A,Getahun H. Tuberculosis and HIV interaction in sub-saharan Africa:impact on patients and programmes; implication for policies. ***Trop Med Int Health*** 2005; 8: 734-742.
4. Wood E, Hogg RS, Yip B, Harrigan PR, Montaner JS. Using baseline CD4 cell count and plasma HIV RNA to guide the initiation of highly active antiretroviral therapy. ***Rev Invest Clin*** 2004; 56: 232-236.
5. Sungkanuparph S, Manosuthi W, Kiertiburanakul S, Vibhagool A. Initiation of antiretroviral therapy in advanced AIDS with active tuberculosis:Clinical experiences from Thailand. ***J Infect*** 2006; 52: 188-194.

Management of cardiac hydatid cyst disease

Mehmet R. Guney, *MD,* ***Bulend Ketenci,*** *MD,*
Serdar Cimen, *MD,* ***Batuhan Ozay,*** *MD,*
Sukru Aksoy, *MD,* ***Bayer Cinar,*** *MD,*
Murat M. Demirtas, *MD.*

Echinococciasis is a tissue infection of humans caused by the larval stage of *Echinococcus granulosus*, *Echinococcus multilocularis*, *Echinococcus oligarthrus*, or *Echinococcus vogel*. The incidence of hydatid disease is 1:2000 in Turkey.[1] Cardiac involvement is rare, occurring in approximately 0.5-2% of cases.[2] Because the introduction of cardiopulmonary bypass (CPB), several successful surgical cases were reported worldwide. Unless the disease is inoperable, patients with cardiac hydatid disease must undergo surgery to avoid life-threatening complications based on compressive mass effect or cyst rupture. The most common are anaphylactic shock, tamponade, pulmonary, intracerebral or peripheral arterial embolism, acute coronary syndrome, arrhythmias and infection. The efficacy of alternative medical therapies is not well established.

Symptoms are usually absent or non-specific and include chest pain, dyspnea on exercise, and fever. A septal cyst can produce conduction defects, and protrusion into a cardiac chamber may intermittently restricted in-outflow tract and may cause syncope. (Stokes-Adams Syndrome) Rupture into the pericardial cavity produces tamponade, an effusion, pericarditis, or multiple pericardial cysts. When rupture intracardiac chambers occurs it may result in anaphylaxis, pulmonary or systemic embolism of daughter cysts. Hydatid cysts complicating the heart mostly involve myocardium and may expand intracardiac and/or intrapericardial chambers, causing clinical manifestations. Rarity of cardiac localization of echinococci cysts, variety of clinical manifestations, diagnosis and success of surgical treatment forced us to present our experience of surgical management of cardiac echinococciasis. Between 1967-2003, more than 1300 hydatid cyst patients were operated in Siyami Ersek Thoracic and Cardiovascular Surgery Centre, Istanbul Turkey, of which 28 had cysts complicating the heart and were treated with 29 operations (one recurrence). Patients with polyvisceral cysts but not having cardiac complication were not included in the study. This retrospective study was initiated with the Institutional Review Board. Today diagnosis relatively easy with the advanced imaging modalities such as transthoracic echocardiography (TTE), multi-slice computed tomography (CT), magnetic resonance imaging (MRI). The main method used in cyst surgery was "enucleation," which comprised cyst fluid aspiration from cystotomy, complete removal of germinative membrane, and repair of resultant defect with purse-strings using pericystic membrane.

"Total cystectomy" was used in some intra-atrial, epicardial, and extra cardiac cysts, removed either by pericystic dissection, or with their atrial or pericardial attachments. In cysts carrying the risk of rupture during exploration and manipulation due to being large (>5 cm), distended or adherent, "fine needle aspiration" and sterilization with cysticidal solutions were applied before enucleation. Cardiac cysts may be multiple or solitary. Moreover, polyvisceral cardiac hydatid cyst (HC) should be examined. Cysts were located in the myocardium in 16 and 9 in the pericardium and the paracardium in 4 cases. All diagnosed patients were surgically treated. Except uncomplicated and lateral cysts, the preferred thoracic access was median sternotomy (64%). Overall 48% of the patients and 88% of the myocardial cysts were operated through median sternotomy and by CPB. Video-assisted thoracoscopic surgery (VATS) was successful in one case, which was relatively immobile and in paracardiac position. (**Table 1**) There were 2 early mortalities (7%), one of which resulted from the iatrogenic re-rupture of a RA cyst with thrombus formation. The second one had a preoperative diagnosis of chronic corpulmonale and pulmonary hydatidosis and died at 3rd day postoperative due to intractable right heart failure. During the cumulative follow-up of 363.4 patient-years there was only one recurrence (3.6%). Cardiac hydatid cysts develop in many parts of the heart such as the left ventricle (55-71%), right

Table 1 - Clinical and surgical documentation of cases.

Cases	Age/gender	Location of hydatid cyst	Clinical presentation	Operation
1	38/F	RV	Ventricular arrhythmias	MS/Enucleation
2	17/F	RV	Ventricular arrhythmias	MS/Enucleation
3	36/F	RV	Papillary muscle displacement (with TI)	MS/Enucleation
4	44/F	IVS	Conduction disorders (blocks)	MS/Enucleation
5	61/M	LV	Displacement of coronary artery/Angina Pectoris	MS/Enucleation
6	35/M	RV	Conduction disorders (blocks)	MS/Enucleation
7	12/M	RV	Displacement of coronary artery/ Angina Pectoris	MS/Enucleation
8	33/M	RA	Corpulmonale	MS/Total cystectomy
9	14/F	LV	Cardiac tamponade	Minimal invasive/Enucleation
10	18/F	LV	Ventricular cavity lifting (with MI)	MS/Enucleation
11	42/F	RA	Atrial arrhythmias	MS/Total cystectomy
12	17/F	LV	Pericardial stretch with chest pain	MS/Enucleation
13	42/M	LV	Ventricular arrhythmias	MS/Enucleation
14	55/F	LA	Atrial arrhythmias	MS/Total cystectomy
15	38/F	RV	Weakness, malaise, chills, urticaria, presyncope	MS/Enucleation
16	16/M	Pericardial	Pericardial effusion	LT/Total cystectomy
17	29/M	Pericardial	Ventricular arrhythmias	LT/Total cystectomy
18	49/F	Pericardial	Pericardial effusion	MS/Total cystectomy
19	23/M	Pericardial	Atrial arrhythmias	LT/Enucleation
20	55/M	Pericardial	Pericardial effusion	MS/Enucleation
21	38/F	Pericardial	Pericardial stretch with chest pain	LT/Total cystectomy
22	40/F	Pericardial	Pericardial stretch with chest pain	LT/Total cystectomy
23	17/F	Pericardial	Pericardial stretch with chest pain	LT/Total cystectomy
24	26/M	Pericardial	Pericardial stretch with chest pain	MS/Enucleation
25	57/M	Diaphragm	Hemidiaphragm paralysis	LT/Cyst aspiration-sterilization
26	31/F	Hilus	Lobar pulmonary atelectasis	LT/Cyst aspiration-sterilization
27	25/F	Para-aortic	Aortic root compression (with AI)	Minimal invasive/Enucleation
28	31/F	PA	Ventricular arrhythmias	MS/Enucleation
29	17/F	LV	Pericardial effusion	MS/Enucleation

LV - left ventricle, RV - right ventricle, PA - pulmonary artery, RA - right atrium, TI - tricuspid insufficiency, AI - aortic insufficiency, MI - mitral insufficiency, MS - median sternotomy, LT - lateral thoracotomy

ventricle (13-18%), interventricular septum (5-13%), right atrium (2-4%), and left atrium (8%).[3] Several hypotheses have been proposed for the predilection for left ventricular location, including dominance of the left coronary artery, better conditions of the left ventricular myocardial mass for parasitic development, and different pressure regimens.[4] The HCs of the heart can result in serious consequences such as rupture into the circulation with drastic anaphylactic reaction, ischemic syndromes from compression of coronary arteries, conduction abnormalities from bundle compression, heart failure, systemic or pulmonary embolization. Advanced imaging modalities are capable to demonstrate cyst biological stage and even rim of it. This rim represents the fibrous tissue-rich pericystic membrane and is helpful for surgical repair.

Our surgical strategy is as follows: we determined the exact cyst localizations-protrusions preoperatively for ideal surgery. All diagnosed patients were subjected to urgent surgical schedule due to the potential risk of sudden death and severe secondary complications. For the same reasons, we immediately send the patient to related surgeons to have the cysts in other organs removed. Optimal surgical management requires a wide exposure of the chest contents, hence the preference of median sternotomy. This incision also permits the concurrent removal of pulmonary cysts without the need for additional thoracic incision or trans-sternal bilateral thoracotomy. Cardiopulmonary bypass is an obligation for cavity confluent cysts and concomitant cardiac surgery. However, we use it preferentially often as this is believed to permit the ideal cyst surgery in a bloodless and motionless surgical area (also avoiding contamination), a wider scope for exploration and manipulation (in multiple cysts, posterior cysts, near to the vital structures, pericardial adhesion). Though total cystectomy has minimal risk of contamination and residue, the preferred method, like in our series, is usually enucleation. This method permits to reach the cysts in all localizations by transmyocardial exploration, allows the complete repair of resultant defect using strong native-tissue pericystic membrane, and avoids the risk of injury to vital structures because it does not require pericystic dissection.

We spend tough efforts to avoid intraoperative contamination, hence recurrence, by the methods mentioned above. We apply initial aspiration-sterilization to cysts, if slightest concern for rupture risk. Video-assisted thoracoscopic surgery that we used for the first time in cyst surgery carried all the advantages of minimal invasive surgery. It seemed suitable for rather immobile and anterior cysts (paracardiac, pericardial, even myocardial with intrapericardial protrusion). We think that routine postoperative cysticidal medication and systematic follow-up are essential to lower the recurrence rate. After cyst surgery, medical therapy (Albendazole 10-15 mg/kg) should be given to prevent the recurrence. If surgery is contraindicated or refused by the patient, medical therapy might be an alternative.

Received 2nd April 2007. Accepted 21st November 2007.

From the Departments of Cardiovascular Surgery (Guney, Ketenci, Cimen, Ozay, Cinar, Demirtas) and Cardiology (Aksoy), Siyami Ersek Thoracic and Cardiovascular Surgery Centre, Istanbul Turkey. Address correspondence and reprint requests to: Dr. Mehmet R. Guney, Department of Cardiovascular Surgery, Siyami Ersek Thoracic and Cardiovascular Surgery Centre, Derya sok. Beta-2 site E-blok No: 2/53 Sahrayı Cedid, 81060, Istanbul, Turkey. Tel. +90 (216) 4785993. Fax. +90 (216) 3862177. E-mail: bulendketenci@gmail.com

References

1. Akar R, Eryilmaz S, Yazicioğlu L, Eren NT, Durdu S, Uysalel A, et al. Surgery for cardiac hydatid disease: an Anatolian experience. ***Anadolu Kardiyol Derg*** 2003; 3: 238-244.
2. Al-Mahroos HM, Garadah TS, Aref MH, Al-Bannay RA. Cardiac echinococcosis: echocardiographic diagnosis with a fatal clinical outcome. ***Saudi Med J*** 2005; 26: 1803-1805.
3. Sensoz Y, Ozkokeli M, Ates M, Akcar M. Right ventricle hydatid cyst requiring tricuspid valve excision. ***Int J Cardiol*** 2005; 101: 339-341.
4. Thameur H, Abdelmoula S, Chenik S, Bey M, Ziadi M, Mestiri T, et al. Cardiopericardial hydatid cysts. ***World J Surg*** 2001; 25: 58-67.