

FIRST YEAR EXPERIENCE OF A NEW ESTABLISHED ELECTROPHYSIOLOGY LABORATORY

YENİ KURULMUŞ BİR ELEKTROFİZYOLOJİ LABORATUVARININ İLK BİR YILLIK TECRÜBESİ

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Kabul Tarihi: 18.Eylül.2014

Balıkesir Sağlık Bilimleri Dergisi

ISSN: 2146-9601

e-ISSN: 2147-2238

bsbd@balikesir.edu.tr

www.bau-sbdergisi.com

doi: [10.5505/bsbd.2015.05900](https://doi.org/10.5505/bsbd.2015.05900)

ÖZET

AMAÇ: Aritmiler, kardiyolojiyi ilgilendiren hastalık grubu içinde önemli yer tutarlar. Aritmi hastalarının tanı ve tedavisinde seçkin bir tedavi metodu olan elektrofizyolojik çalışma ve ablasyon; özel ilgi, zaman ve eğitim gerektiren bir yaklaşımdır. Merkezimizde yeni kurulan laboratuvarımızın ilk yıl kabul ettiği hasta profilini, yapılan işlemleri, başarı oranlarını, komplikasyonları ve nüksleri incelemeyi amaçladık.

YÖNTEMLER: Bursa Yüksek İhtisas Eğitim ve Araştırma Hastanesi hasta kayıtları geriye dönük olarak incelendi. Ocak 2013'te kurulan elektrofizyoloji laboratuvarına, Ocak 2014'e kadar kabul edilen hastalar tespit edildi. Hastaların yaşları, cinsiyetleri, elektrofizyolojik çalışma sonrası tanıları, eşlik eden hastalıkları, yapılan işlem, poliklinik takip verileri, işlemin kısa ve orta vade başarısı, nüks oranı ve komplikasyonlar tarandı.

BULGULAR: Geriye dönük olarak taranan toplam hasta sayısı 131, toplam işlem sayısı ise mükerrer işlemler dahil olmak üzere 231 idi. İşlemlerin %59 tanısal, %41 ise tedavi edici amaçla yapılmıştı. Tanısal işlemlerin sonucunda % 80 (n=100) supraventriküler taşikardi, %5,2 (n=7) normal bulgular, %6,7 (n=9) ventriküler taşikardi, %11,1 (n=15) AV ve/veya SA nod hastalığı tanıları konulmuştu.

SONUÇ: Merkezimizde elektrofizyoloji laboratuvarının kurulması sonrasındaki ilk yıl verileri ümit vericidir. Merkezimizde 2013 yılında işlem/iş günü oranı 0,91 idi. Bu oran, neredeyse her çalışma gününe bir işlem (tanısal ya da tedavi edici) anlamına geliyordu. Ablasyon/iş günü oranı ise 0,37 olup, her üç iş gününden bir tanesinde ablasyon yapıldığı (basit ya da ileri düzey farkı gözetmeksizin) olarak yorumlandı. Ekibin uyumu ve operatör sayısının artmasıyla, EFÇ için ayrılan sürenin artışıyla ilerleyen yıllarda kompleks işlem sayısının artacağını düşünüyoruz.

Anahtar Kelimeler: Aritmi, Elektrofizyoloji, Ablasyon

SUMMARY

OBJECTIVE: One of the most frequent diagnosis in whole group of cardiologic diseases are arrhythmias. Electrophysiological study and ablation, which are elite methods for diagnosis and treatment of arrhythmias, require special interest and training. Our aim is to investigate the patient profile, interventions, success rates, complications and recurrences of our newly established laboratory in first year.

METHODS: Retrospectively analysis of Bursa Ihtisas Training and Research Hospital were done. All cases who underwent electrophysiological study and ablation were detected. All patient demographic and procedural data were collected.

RESULTS: A total of 131 patients and 231 procedures, including diagnostic and therapeutic and re-do cases, were examined. Fifty-nine percent of all cases were diagnostic, remaining 41 % were therapeutic. Diagnosis of all cases were: 80% (n=100) supraventricular tachycardia, 5.2% (n=7) normal findings, 6.7% (n=9) were ventricular tachycardia, 11.1% (n=15) were AV and/or SA nod disease.

CONCLUSION: First year experience of our newly established laboratory are hopeful. In our center, procedure to working day ratio was 0.91, meaning one procedure daily. Ablation to working day ratio was 0.37, meaning one therapeutic procedure every three days, without excluding complex procedures. In our opinion, development of team-work and harmony, and also increase in operator number would lead to an increase in amount of complex procedures.

Key words: Arrhythmia, Electrophysiology, Ablation

INTRODUCTION

Arrhythmias take major place in the spectrum of cardiac diseases. One of the most frequent complaints of individuals who admit to cardiology clinic is palpitation.¹Sometimes it is hard to reach a definite diagnosis if patients' arrhythmia was undocumented. In patients who have infrequent episodes, it can take months to catch the moment arrhythmia kicks in and take an electrocardiogram (ECG) of it, regardless of arrhythmia type. In situations like these, clinician may apply 24-hour rhythm recorders (Holter).² Although recording time for these devices vary from one day to one week, sometimes they show little help for infrequent clinical arrhythmia episodes. There are other devices on the market that record longer period or make recording available with a push-button when arrhythmia occurs. Unfortunately, both their invasive implantation method and uncovered payment by healthcare system fairly limit their widespread use in our country.

Patients who frequently admit to outpatient clinic with complaints like palpitation which resemble arrhythmic disease or patients who are under empiric drug treatment for arrhythmia which they could not get any benefit from; continue their hospital visits until a definite diagnosis is reached. On the other hand, resistance to medical therapy is not rare for cardiac arrhythmias. In situations like these, electrophysiological study (EPS) is the key to definite diagnosis and a chance for radical treatment.³Although EPS is an exclusive method for diagnosis and treatment for arrhythmias, requirement of special interest, training and experience makes it hard for cardiologists to approach this branch of cardiology. In our study, we aimed to examine the patient profile, procedure types, and success, complication and recurrence rates of our newly established electrophysiology laboratory; ran by a single operator.

METHOD

Patient records of Bursa Postdoctorate Training and Research Hospital were retrospectively analyzed. Data of patients who admitted to our clinic and underwent EPS from January 2013, when the laboratory was first established, to January 2014 were collected. Age, sex, post-EPS diagnosis, comorbidity, electrophysiological procedure type, outpatient clinic data, short and middle term success rate, recurrence and complications of patients were scanned and recorded.

Recorded variables were collected in SPSS 16.0 for Windows (Illinois, USA) database. Parametric data were expressed as means and \pm standard deviations, nonparametric data were expressed as percents.

RESULTS

Total number of patients who were retrospectively analysed was 131, total procedure count (including repeated ones) was 231. Of all procedures, 59% were diagnostic, 41% were therapeutic. Forty five percent of the patients were male (n=59). Mean age for whole group was 49.5 ± 15.9 ; for male sex it was 50.5 ± 15.5 ; for female patients it was 48.6 ± 16.2 and there was not any significant age difference between both sexes ($p=0.487$). Post-procedural diagnoses were also examined. After diagnostic procedures, 80% (n=100) of patients were diagnosed as supraventricular tachycardia, 5.2% (n=7) were normal, 6.7% (n=9) were ventricular tachycardia, 11.1% (n=15) were atrioventricular and/or sinoatrial nodal disease.

Of all patients who were diagnosed as supraventricular tachycardia, 37.8% (n=50) of them were atrioventricular nodal reentry tachycardia (AVNRT), 9.8% (n=13) of them were atrioventricular reentry tachycardia (AVRT), 7.5% (n=10) of them were atrial tachycardia (AT), atrial flutter (AFL) and multifocal nonsustained atrial tachycardia. Twelve patient underwent accessory pathway ablation due to Wolff-Parkinson-White Syndrome. Sixteen patient suffered from paroxysmal atrial fibrillation (PAF). Nine of them underwent pulmonary vein isolation, 7 of them by cryoenergy and 2 of them by radiofrequency. Cryoenergy was not only utilized in PAF cases, but also in 2 patients who had septal accessory pathway. Other accessory pathways were located as, 5 lateral, 4 left-posterior and one nonseptal right atria.

Recurrence rate of all ablation procedures was 9 patients over a total of 94 (9.5%). It was inappropriate to classify these recurrence rates according to diagnoses due to small number of patients in many subgroups. Only statistically satisfying results were derived from AVNRT and accessory pathway (Both AVRT and WPW together). There was only one patient who had shown recurrence out of 50 individuals (2%). Two other AVNRT patients were left for cryoablation because of high risk of atrioventricular block. These two patients had shown transient atrioventricular block with mechanical pressure on atrioventricular node. Patients who show recurrence underwent second procedure for cure. On the other hand, there was a higher recurrence rate in accessory way population, which was 8% (2/25). Those two patients had left lateral side accessory pathway.

DISCUSSION

First year postprocedural results of our newly established electrophysiology laboratory are promising. As a classic knowledge, acute procedural success is over 95% and recurrence rate is between 2-5% in patients who were diagnosed as AVNRT and underwent slow pathway ablation.⁴⁻¹¹ In our laboratory, excluding two patients who were left for cryoablation at a second session, acute success rate for slow pathway ablation was 100%. In addition, recurrence rate was also comparable with classic rate 2%. Complete persisting atrioventricular block, one of the most undesirable complications of slow pathway ablation, was observed in only one patient (2%). At first look, our block rate is incomparable with established rate 0.2-0.6%. However, our patient group is rather a small population, so we assume block rate would diminish to an accepted rate after sufficient numbers of procedures were done in future. Second largest population was the group who underwent ablation for accessory pathway. In this group of 25 patients, acute success rate was 96%. Recurrence rate was incomparable to any generally accepted rate due to variety in pathway locations.

Pulmonary vein isolation with cryoballoon was one of the procedures performed during our first year experience. These cases were followed up without any antiarrhythmic prescription. No recurrence was reported after mean follow up of 102 ± 39 days. Cryoenergy was utilized in two high risk AVNRT and two septal accessory pathways, without any recurrence and complications. We suggest that cryoenergy was utilized in a cost-effective fashion in our laboratory.

Amount of ablation procedures which were performed under three dimensional mapping systems were promising for a new established laboratory. A total of six (4 atrial tachycardia, 2 paroxysmal atrial fibrillation) patients were undertaken for ablation with magnetic sensor patch. One electroanatomic mapping balloon catheter was used for an ischemic ventricular tachycardia case.

As it is known, a dedicated operator team is essential for a reliable and efficient electrophysiological study. This team should include at least one doctor, one or two dedicated nurses, one technician and/or engineer for operating devices and maintaining them and if possible one nearby anesthetist when needed.^{12,13} The most important member of the team is the electrophysiologist physician, who should interpret the results and decide if an ablation or pacemaker needed for cases. In the United States, it is required that operating physician must have complete electrophysiology training and be certified and

also he must have worked in a senior laboratory for one or two years.^{14,15}

However, in our country and other developing countries, there isn't any official certified training for electrophysiology. One should keep in mind that, these certification and training programs are only advices from concerned associations. Therefore, there is no obligation to have a certificate for performing electrophysiology procedures. Of course, it is vital for nurses who are important members of the dedicated team, to have knowledge and experience in rhythm and hemodynamics. Cardiopulmonary resuscitation training and being used to defibrillators and antiarrhythmic drugs are important for safe procedures. If nurses are well informed about the procedures and complications, it provides a great comfort for operator. In addition, a nearby anesthetist would be useful in need of deep sedation for patients and/or management of patients for emergent surgery in case of a serious complication. Finally, an onsite technician or preferably biomedical engineer not only provides efficient utilization of intracardiac stimulators and recordings but also maintenance and repair of devices if needed.

In our newly established center, our dedicated team consists of a doctor, a nurse and a technician who uses stimulator and recorder system. At first step, we naturally encountered some problems about device, consumables, theoretic knowledge. However, after a short period these problems were solved. Of note, complex cases like cryoballoon for PAF and cases that require three dimensional mapping were accepted to laboratory during the second half of the year. We suggest that it is a predictor of increased self-confidence and periprocedural coordination.

CONCLUSION

In our country, inadequate time for electrophysiology procedures in the cath lab is a common problem of invasive centers with high volume. High volume of elective and emergent coronary intervention procedures leave less time for electrophysiology procedures which consume longer time. In addition, repayment by healthcare system for these procedures are very low than they deserve. This status of course affects cost-effective work practice and causes physicians prefer more coronary intervention and less electrophysiology. It is obvious that doing complex cases in long term depend on doing large number of basic and/or intermediate cases in short term. From this point of view, we reached to a case/working dayrate of 0.91 in our center in 2013. This rate should be interpreted as one electrophysiology case (diagnostic or ablation) for one

weekday. Ablation case to working day ratio was 0.37, meaning there was an ablation case for in the laboratory (basic or advanced) every three weekdays. In conclusion, we suggest that complex procedures and total procedure number would increase in our center as the dedicated teamwork develops and operator number increase.

REFERENCES

1. Zimetbaum P, Josephson ME. Evaluation of patients with palpitations. *N Engl J Med* 1998;338 (19):1369–73.
2. Holter NJ. New method for heart studies: continuous electrocardiography of active subjects over long periods is now practical. *Science* 1961;134(3486):1214–20.
3. Josephson ME, Scharf DL, Kastor JA, Kitchen JG. Atrial endocardial activation in man. *Am J Cardiol* 1977;39(7):972-81.
4. Strickberger A, Morady F: Catheter ablation of atrioventricular nodal reentrant tachycardia. "Zipes DP, Jaliffe J (eds): *Cardiac Electrophysiology: From Cell to Bedside*, 4th ed." kitabında s.1028-35, WB Saunders, Philadelphia (2004)
5. Gaita F, Riccardi R, Marco S, Caponi D: Catheter ablation of typical atrioventricular nodal reentrant tachycardia. In "Zipes DP, Haissaguerre M (eds): *Catheter Ablation of Arrhythmias*, 2nd ed." kitabında s. 225-48, Armonk Futura, New York (2002)
6. Gonzalez MD, Rivera J: Ablation of atrioventricular nodal reentry by the anatomical approach. In "Huang S, Wood MA (eds): *Catheter Ablation of Cardiac Arrhythmias*." kitabında s. 325-46, WB Saunders, Philadelphia (2006)
7. Salem YS, Burke MC, Kim SS, Morady F, Knight BP. Slow pathway ablation for atrioventricular nodal reentry using a right internal jugular vein approach: a case series. *Pacing Clin Electrophysiol* 2006;29(1):59-62.
8. Morady F. Radiofrequency ablation as treatment for cardiac arrhythmias. *N Engl J Med* 1999;340(7):534-44.
9. Lee SH, Tai CT, Lee PC, et al: Electrophysiological characteristics of junctional rhythm during ablation of the slow pathway in different types of atrioventricular nodal reentrant tachycardia. *Pacing Clin Electrophysiol* 2005;28(2):111-8.
10. Lipscomb KJ, Zaidi AM, Fitzpatrick AP, Lefroy D. Slow pathway modification for atrioventricular node re-entrant tachycardia: Fast junctional tachycardia predicts adverse prognosis. *Heart* 2001;85(1):44-7.
11. McGavigan AD, Rae AP, Cobbe SM, Rankin AC. Junctional rhythm—a suitable surrogate endpoint in catheter ablation of atrioventricular nodal reentry tachycardia? *Pacing Clin Electrophysiol* 2005;28(10):1052-4.
12. Fisher JD, Cain ME, Ferdinand KC, et al: Catheter ablation for cardiac arrhythmias: Clinical applications, personnel, and facilities. *J Am Coll Cardiol* 1994;24(3):828-33.
13. Zipes DP, DiMarco JP, Gillette PC, et al: Guidelines for clinical intracardiac electrophysiological and catheter ablation procedures. *J Am Coll Cardiol* 1995;26(2):555-73.
14. Tracy CM, Akhtar M, DiMarco JP, et al: American College of Cardiology/American Heart Association clinical competence statement on invasive electrophysiology studies, catheter ablation, and cardioversion. *J Am Coll Cardiol* 2000;36(5):1725-36.
15. Josephson ME, Maloney JD, Barold SS, et al: Guidelines for training in adult cardiovascular medicine. Core cardiology training symposium (COCATS), Task Force 6: training in specialized electrophysiology, cardiac pacing, and arrhythmia management. *J Am Coll Cardiol* 1995;25(1):23-6.