



## A Comparison of Two Electrophysiology Centers in Different Social and Economic Regions of Turkey During First Quarter of the Year

Osman Can Yontar<sup>1\*</sup>, Utku Kutuk<sup>2</sup>, Semih Eriten<sup>2</sup>, Ahmet Tutuncu<sup>1</sup>, Mehmet Melek<sup>1</sup>

<sup>1</sup> Cardiologist, Bursa Postdoctorate Training and Research Hospital, Cardiology Clinic, Bursa, Turkey

<sup>2</sup> Cardiologist, Sivas Numune Hospital, Cardiology Clinic, Sivas, Turkey

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### ABSTRACT

**Introduction:** More and more patients have been undergoing electrophysiological study (EPS) as the number of rhythmologists have increased. Due to the increased interest in the study, today EPS applications are made even in second step public hospitals or private hospitals. Our aim is to compare two electrophysiology labs, that are in different regions with social and economic development, in terms of patient demography, diagnosis, amount of diagnostic and curative interventions.

**Materials and Methods:** In this study, two centers from two different regions of Turkey were selected; a training and research center (center 1) in the Western part and a public hospital (center 2) in the Eastern part of the country. Records of the patients who undergone EPS in these two centers were retrospectively analyzed. Independent parametric data were evaluated by T-test, and categorical data via Mann-Whitney U test. A p value below 0.05 was accepted for significance.

**Results:** A total of 83 patients were retrospectively analyzed (42 from center 1, 41 from center 2). Patients' baseline demographic data was similar except intellectual status. Nevertheless, both groups differed based on the number of patients with diagnosis of atrioventricular reciprocating tachycardia ( $P=0.047$ ). There was a significant difference in procedure types. Center 1 performed significantly higher number of curative procedures ( $P=0.039$ ) than center 2.

**Conclusion:** Nowadays, EPS is spread from specialized centers to middle-sized hospitals. Since specialized centers have more access to the advanced devices such as electro-anatomic mapping rather than conventional equipment, they are evaluating more complex cases with a variety of different diagnosis. Constructing a referral system from peripheral hospitals to distinguished centers in electrophysiology field would eliminate unnecessary and/or repeated procedures and decrease the expenses.

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### Introduction

Heart rhythm problems occur frequently in cardiac patient population. Dysrhythmias are a

group of disease which may affect all age groups and can deteriorate quality of life intensely (1).

\*Corresponding author: Osman Can Yontar, Bursa Yuksek Ihtisas Hastanesi, 152 evler mah. Prof. Tezok cad. No:2, Bursa, TURKEY. Tel: +905056808747; Fax: +90224 360 50 55; E-mail: drcanyontar@gmail.com  
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**Table 1.** Baseline characteristics of two centers.

Parameter	Center 1 (n=42)	Center 2 (n=41)	P value
Age (years, mean)	52.8±15.5	54.2±14.3	0.680
Male sex (n, %)	19 (45.1%)	12 (29.3%)	0.133
Diabetes (n, %)	2 (4.8%)	1 (2.4%)	0.571
Hypertension (n, %)	17 (40.5%)	22 (53.7%)	0.229
Smoking (n, %)	16 (38.1%)	16 (39%)	0.931
Critical coronary disease (n, %)	6 (14.3%)	6 (14.6%)	0.964
Critical valve disease (n, %)	2 (4.8%)	2 (4.9%)	0.980

Treatment options are limited and medical therapy was favored by clinicians until nineties (2). Other treatment option is an invasive but largely curative entity. Electrophysiological study (EPS) is an eminent method for assessing cardiac arrhythmias (3). Many patients' rhythm problem may remain masked while undergoing other tests, like 24-hours rhythm recording. Main advantage of EPS over other methods is the chance to induce and reproduce the rhythm problem instead of waiting for its occurrence for diagnosis. Today more and more patients have undergone EPS as the number of sophisticated rhythmologists increase (4). In the last decade, the application of EPS was limited to the specialized centers or universities; there were few experienced rhythmologists across the country, so patients had to wait for a relatively long period until operation. Due to the increased tendencies of the cardiologists in this field, improved accessibility of the health services, and technical developments in the industry (5), today EPS applications are made even in second step public hospitals or private hospitals. Aim of our study is to compare two electrophysiology labs in terms of patient demography, diagnosis of patients who underwent EPS, number of diagnostic and curative interventions and success rates.

## Materials and Methods

This is a retrospective study. Retrospective studies are approved by Turkish Ministry of Health Ethics Committee. For comparison, a training and research center (Bursa Yuksek Ihtisas Hospital) on the Western region of Turkey and a public hospital (Sivas Numune Hospital) on the Eastern region of Turkey were selected. Records of patients who undergone EPS in these two centers between January 2013 and May 2013 were retrospectively analyzed. Patients' age, sex, educational status and comorbidity were recorded. Intervention types and success rates and major complications were also noted. Operator number and experience was different between centers, as expected. Research center has three operators (>75 cases/year per operator) and public hospital has only one (>50 cases/year).

**Table 2.** Postprocedure diagnosis of patients in two centers.

Diagnosis	Center 1 (n=42)	Center 2 (n=41)	P value
Normal (%)	2 (4.8%)	8 (19.5%)	0.039
FAT (%)	6 (14.3%)	1 (2.4%)	0.052
AVNRT (%)	16 (38.1%)	15 (36.6%)	0.887
AVRT (%)	8 (19%)	2 (4.9%)	0.047

AVRT: Atrioventricular reciprocating tachycardia

AVNRT: Atrioventricular nodal reentry tachycardia

FAT: Focal atrial tachycardia

## Statistical analysis

Parametric data were expressed as mean (Standard deviation), and categorical data as percentages. SPSS 13.0 (SPSS, Inc., Chicago, Illinois) was used to perform statistical procedures. Difference between groups in terms of independent parametric data were evaluated by T-test, and categorical data via Mann-Whitney U test. A p value ≤0.05 was accepted significant.

## Results

A total of 83 patients were retrospectively analyzed. Forty-two patients' data were from research hospital (center 1) while remaining 41 patients' data were from public hospital (center 2). Mean age of patients for center 1 was 52.8±15.5, similarly it is 54.2±14.3 for center 2 ( $P=0.680$ ). Two centers were alike in demographic characteristics which are listed in Table 1. Intellectual state of two populations was different ( $P=0.024$ ). Center 1 has less illiterate patients ( $n=1$ , 2.4%) than center 2 (7, 17.1%) with statistical difference ( $P=0.023$ ). Center 1 has significantly more college graduates ( $n=6$ , 14.3%) while center 2 has none ( $P=0.012$ ).

As expected, most of the patients in both centers were atrioventricular nodal reentry tachycardia (AVNRT) (center 1:  $n=16$ , 38.1%; center 2:  $n=15$ , 36.6%,  $P=0.887$ ). Unless, center 1 had more patients with atrioventricular reciprocating tachycardia (AVRT) (center 1:  $n=8$ , 19%; center 2:  $n=2$ , 4.9%,  $P=0.047$ ) and focal atrial tachycardia (FAT) (center 1:  $n=6$ , 14.3%; center 2:  $n=1$ , 2.4%,  $P=0.052$ ). Eight patients in center 2 (19.5%) had completely normal electrophysiological findings whereas there were only two (4.8%) in center 1 ( $P=0.039$ ) (Table 2).

## Discussion

Electrophysiological study is a sophisticated rhythm assessment which should be done by cardiologists who have experience in this field. Mostly, EPS is the last step of diagnostic algorithm for patients who suffer from paroxysmal supraventricular or ventricular tachycardia. It also provides a curative approach for most of tachyarrhythmia. In experienced hands there is a very high chance of complete cure for most rhythm problems (6). As the time goes by, this sophisticated intervention spreads

from special centers to middle-sized public hospitals due to advancement in medical technology (7). However, operator experience still plays a major role selecting patients for EPS. As we mentioned above, in specialized centers accessibility to more complex devices (8, 9) rather than conventional equipment, such as electro-anatomic mapping, magnetic remote navigation, cryoenergy etc., provides self-confidence to physicians and facilitates doing more complex cases with a variety of different diagnosis. In relatively small public hospitals, physicians may prefer basic cases because of limited experience, time or technology which is quite acceptable. At these centers, success rate may not be low but we think that this is due to the fact that physicians accept similar and relatively basic cases (e.g. AVNRT) not complicated ones (e. g. AT, ventricular tachycardia). In our study, results showed that there were significantly more diagnostic procedures in middle-sized public hospital (n=26, 63.4%) during sample time. On the other hand, physicians mostly performed curative approaches in research hospital (n=25, %59, p=0.037). This was also not unexpected; because of handicaps written above physicians tend to take diagnostic cases for bradycardia or syncope evaluation. Another explanation for this could be physicians giving up ablative therapy if patient was diagnosed with FAT or AVRT during the procedure due to technical difficulty of ablation therapy (10, 11).

### Conclusion

Established centers in developed cities generally attract more patients than other centers. These are mainly referral centers that are acceptable to the patients as last stop for curative treatment. Not only patients with definite diagnosis and the ones who are unable to get a certain relief from symptoms admitting these hospitals, but also individuals in need for definite diagnostic approach prefer these centers. Employing electrophysiologists at various peripheral hospitals is merely possible because of economic terms in our country. In addition, this process requires team work and an experienced hand may not be enough for success and expanding diagnosis spectrum and doing complex caeses. Because of same funding terms, deploying advanced equipments at these hospitals is almost impossible. We suggest that governments should follow a health policy that would construct a referral system from peripheral hospitals to central facilities in which experienced and distinguished physicians can work in electrophysiology field. This type of approach would eliminate unnecessary and/or

repeated diagnostic procedures and decrease the expenses (12).

### Limitations

Relatively small number of patients in both groups is one of the main limitations of our study. Naturally, it is difficult to draw definite conclusions. This is due to the fact that one of the centers (public hospital) in our study is located in a region that people mostly move away from the town during summer time leading a sharp decrease in hospital admissions. Therefore, we had to take a sample time period with acceptable and comparable procedure rates for an unbiased comparison of two centers.

### Conflict of Interest

The authors declare no conflict of interest.

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