CARDIAC SURGERY – PRESENT AND FUTURE.
COMPARISON EUROPEAN CARDIAC SURGERY REGISTER AND
CARDIAC SURGICAL PRACTICE IN UNIVERSITY CARDIAC
SURGERY – VARNA

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SUMMARY

With presented study we intend to compare cardiac surgical practice in Varna – Bulgaria with data presented by First Adult Cardiac Surgery Database Report 2003 (FACSDR 2003), which is representative for European cardiac surgical practice. Ten months results of University Cardiac Surgery Department – Varna were used. Demographic profile, type of the operation, hospital stay and mortality were studied and compared. All selected parameters were comparable with those from FACSDR 2003. Major tendencies of modern cardiac surgery were summarized and extrapolated to Bulgarian population. The grounds for national cardiac surgical registry in Bulgaria were stated.

Keywords: First Adult Cardiac Surgery Database Report, cardiac surgery practice, cardiac surgery procedures

INTRODUCTION

In 2003 European Association for Cardiac and Thoracic Surgery published First Adult Cardiac Surgical Database Report 2003 (FACSDR 2003), a product of years of research done by Prof. Bruce Keogh and a EACTS working group. FACSDR 2003 summarize data from cardiac surgical procedures in 12 countries. Data were collected from single centers and national registries. It gives an illustration of demographic profile, proportion of different cardiac operations, risk factors and hospital stay. It gives an model for stating guidelines for good cardiac surgical practice in Europe and is a powerful tool for assessing quality and outlining the trends in cardiac surgery (1).

Despite short history of University Cardiac Surgery Department – Varna, we came to a point in which we are faced to necessity of review of our work and outlining major tendencies and trends in our development. Because of the absence of national cardiac surgical registry in Bulgaria we are not able to compare to cardiac surgical centers in our country. We used FACSDR 2003 as most representative for cardiac surgical practice across Europe

HYPOTHESIS

We intend to proof the hypothesis that the demographic profile of patients, and surgical spectrum of operations in Varna are similar to those on countries included in FACSDR 2003.

METHODS

Data from the registry of University Cardiac Surgery Department – Varna for a ten months period (from 15 June 2005 to 15 April 2006) statistically treated they were compared to FACSDR 2003 data. The following parameters were studied age, gender, left ventricle function, hospital stay and 30 day mortality. Data of all patients aged over 18 years with a procedure listed in National Health Insurance Fund as major cardiac surgery were collected. Two major procedures in a single patient in one hospitalization were included as one combined surgery. Age, gender and mortality data were taken from hospital patient registry. Study of left ventricle function was done using data from preoperative transthoracic echocardiography. In hospital stay was taken from data of Statistics Service at our hospital. Data proceeding was done using Microsoft software products.

RESULTS

During selected period 240 surgeries were performed. Proportion by type of operation shows no differences compared to FACSDR 2003 average proportion (Fig. 1). The majority of the patients underwent coronary surgery (CABG). In 162 (67, 5%) a CABG was performed using extracorporeal circulation (ECC), aortic cross clamp and cardioplegia (crystalloid (92) and blood (70)). 525 distal coronary anastomosis were made, average count per patient is
3.24 anastomosis. In 93.7% (150 patients) a mamma-
internal sinistra (a. thoracica interna sinistra) was
used. In 16 patients (6.3%) coronary bypass grafting was
done on beating heart using OCTOPUS IV (Medtronic inc.)
stabilizer. No conversion to ECC was observed.

In all valve repairs ring anuloplasty was applied.
Other operations consist of 12 (5%) patients with ascending
aorta urgent surgery in dissection of aorta (Stanford type A)
and surgery for congenital defects in adults (ASD and
reoperation after coarctation repair).
Average age of patients operated is 61.9 (18-78) years.
Compared to those in other countries younger is only the
population in Turkey (Fig. 2).
During the FACSD 2003 (1997-2003) a tendency of in-
creasing of the average age was observed in Europe (Fig. 3).

Single valve operations are aortic and mitral replacement
with prosthesis in valve disease inflammatory or degenera-
tive in etiology, including infectious endocarditis as well
(one reoperation for prosthetic endocarditis of aortic valve
prosthesis). 18 mechanical valves were used in aortic-13
and mitral-5 position. Mechanical prosthesis were two ma-
jor types bileaflet or tilting disc. In aortic and mitral position
2 tissue valve prosthesis were implanted. Complex surger-
ies are those consisting of two major procedures (Tabl. 1)

Table 1

<table>
<thead>
<tr>
<th>Description</th>
<th>Patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>coronary artery revascularization and aortic valve</td>
<td>9</td>
</tr>
<tr>
<td>replacement</td>
<td></td>
</tr>
<tr>
<td>coronary artery revascularization and mitral valve</td>
<td>4</td>
</tr>
<tr>
<td>replacement</td>
<td></td>
</tr>
<tr>
<td>coronary artery revascularization and mitral valve</td>
<td>7</td>
</tr>
<tr>
<td>repair</td>
<td></td>
</tr>
<tr>
<td>coronary artery revascularization and ASD closure</td>
<td>1</td>
</tr>
<tr>
<td>aortic and mitral valve replacement</td>
<td>5</td>
</tr>
<tr>
<td>aortic replacement with mitral valve repair</td>
<td>2</td>
</tr>
<tr>
<td>aortic valve replacement with ascending aortic repair</td>
<td>2</td>
</tr>
<tr>
<td>aortic valve and aorta ascendens replacement (condit)</td>
<td>1</td>
</tr>
</tbody>
</table>

In cardiac surgical population the prevalence of male gen-
der is observed. Proportion of female patients in our group
is 25% (60 patients), and it refers to that proportion in other
countries (Fig. 4). Among valve surgery patients females
are 53% and 84% of patients with isolated CABG are
males. Female gender according to EUROSCORE risk
stratification system is independent risk factor in CABG
surgery.

Left ventricle dysfunction is one of the leading risk factors
for cardiac surgery (EUROSCORE). By definition it is
ejection fraction of left ventricle measured by
echocardiography below 40%. It is related with more
postoperative inotropes, intra aortic balloon pump, acute
renal failure, prolonged intensive care, prolonged
inhospital stay and higher morbidity and mortality rates. 35
patients in our group presents with left ventricle
dysfunction. In FACSDR 2003 this patients consist one 1/5 and this proportion did not change during the whole studied period (1997-2003).
The average hospitalization period for our department is 10,2 days, In some of the European countries it is with 40% shorter. The average inhospital stay for Europe is 9 days. (Fig. 5).

<table>
<thead>
<tr>
<th>Switzerland</th>
<th>Turkey</th>
<th>Portugal</th>
<th>UK</th>
<th>Italy</th>
<th>Bulgaria (Varna)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>3</td>
<td>6</td>
<td>9</td>
<td>12</td>
<td></td>
</tr>
</tbody>
</table>

Figure 5. Inhospital stay

Because of difficulties in comparison between centers 30 days mortality is not present as independent value in FACSDR 2003. For our center 30 days mortality is 0,08% - two patients (one elective CABG, and one with salvage surgery for acute aortic dissection Stanford type A).
Limitations: Despite our effort to find some tendencies valid for Bulgarian cardiac surgical population we must take in account the following limitations of our study: the studied period is short and the number of patients is relatively small.
All studied parameters of University Cardiac Surgery Department - Varna are in FACSDR 2003 range.

DISCUSSION

Presented study shows demographic profile of cardiac surgical patients in Varna, distribution of operations and hospitalization continuum. Because of the limitations of results are not representative for Bulgarian population. High similarity with FACSDR 2003 data could be found (1).
Tendency of increasing average age of cardiac surgical patients is presented worldwide. Cardiac surgeons are faced to raising proportion of patients over seventy years of age. This group presents with increased risk for cardiac surgery.
Recent studies report excellent results in octogenarian series (2,3,4). Improving in extracorporeal systems and extension of beating heart surgery indications, as well as advances in cardiac protection and anesthesia as, lead to reassessment of contraindications related to advanced age. (5,6). We are expecting this tendency to become valid in our population too.
Gender proportion in our patients is similar to FACSDR 2003 (1).
Distribution of operation is close to average European proportion, illustrated in FACSDR 2003. With respect to limitations of our study this proportion could be valid for cardiac surgery in Bulgaria.
Rates of CABG are continually are going down displaced by more and more aggressive interventional cardiology. This process will come to a balance and even a renaissance of surgery could be expected. In a large number of patients PTCA shows no advantages over CABG. Surgery is an option in those with failed PTCA. Long term results in patients with multiple coronary lesions should be studied and not the last the cost effectiveness of PTCA is disputable (7,8,9,10,11).
Increase in complex procedures could be progresses in relation to aging and associated valve degeneration combined with coronary pathology (12). Indications for mitral valve anuloplasty in ischemic mitral regurgitation are extended and even mild insufficiency is corrected in conjunction with CABG (13,14,15). Surgical procedures for atrial fibrillation are with proven benefit in patients undergoing coronary surgery (16).
Major trend in cardiac surgery is beating heart surgery avoiding side effects of extracorporeal circulation (17,18). Going up with the learning in beating heart surgery most of the prior limitations are abandoned. A large group of patients with coronary anatomy specificity, complicated comorbidity state, or advanced age successful revascularization is performed avoiding ECC and its side effects. (18,19,20).
Valve operations are rising gradually due to advances in early diagnosis and new trends in assessing heart valve diseases (12). Taking into consideration accepted guidelines for surgical treatment in patients with inflammatory, degenerative and ischemic valve morbidity more patients will come early to cardiac surgeon.
The low left ventricle ejection fraction group is about 1/5 and keeps this proportion during the whole period of FACSDR 2003 (1). Our portion of such patient is similar. Patients with poor left ventricle are with increased risk of perioperative morbidity and mortality. Intraortic balloon pump or assist device is often used in patients presenting with severe cardiac failure (21). For our group frequency of using I.A.B.P. is 3%-8 patients. A recent therapy in cardiac failure patients with intraventricular asynchrony is cardiac resynchronization therapy. Most of the cases are with significant functional improvement and in some it could be taken as cardiac transplantation alternative (22,23). This therapy was introduced in Bulgaria not long ago and we performed the first case with valve surgery and permanent pacemaker for left ventricle pacing.
Inhospital stay of cardiac surgical patients is an important factor mainly in financial aspect. On the other side it is sensitive to factors as therapeutic process organization, quality of surgery and early rehabilitation quality (24). Tendency to shorten hospitalization is typical for health systems with well organized rehabilitation and social activities after discharge home. In our analysis average duration of hospitalization is generalized for urgent and elective patients as well as such needing preoperative medical therapy for stabilization prior to surgery. This leads to prolonged average
in hospital stay. We should take into account absence of regional cardiac rehabilitation center. Steps toward founding such center were recently taken. We hope that in short we will reach mean hospitalization site in FACSDR 2003 (1). Early postoperative mortality in our group (0.08%) is lower than data from some of the European registers (in FACSDR 2003 it is not present). For CABG patients our mortality rate is 0.4 (1 patient). In Italian CABG register (64 centers) early mortality for CABG patients is 2.61% (ranging from 0.33 to 7.63%) (25). In urgent and emergency surgery mortality according to registry data is rising up - in aortic dissection type A it is 25.1% (26).

CONCLUSION

Presented study of fundamental demographic and surgical data of cardiac surgical patients in University Cardiac Surgery Department - Varna shows similarity to those from FACSDR 2003, demonstrating that in spite short history of our department its surgical activity is in correspondence with the spectrum of cardiac surgery across Europe. Absence of united cardiac surgery registry in Bulgaria makes it difficult to judge if this profile is typical for Bulgarian cardiac surgery.

Results of cardiac surgery are easy to evaluate and measure (1, 27). This had led to starting national registers in United Kingdom, Germany, and France and as a final European Adult Cardiac Surgery Data Base. In USA cardiac surgery data base has even longer history - Society of Thoracic Surgeons Database Registry. Beside data we accentuated in our study organizing data in national register give possibility for studying efficacy of each center or independent surgeons in medical and economical aspects (27). Starting Bulgarian Cardiac Surgical Database is of great importance for medical professionals - cardiologists and cardiac surgeons, but for the patients as well. It will give a realistic view to present state of cardiac surgery in Bulgaria and support further efforts for improving quality and patient care. Unbiased collecting of these data from all cardiac surgical centers in Bulgaria and reporting them will be benefit for patient treatment process and for optimizing healthcare expenses (27).

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