

Financing models for intensive care units in the Austrian DRG-system

Pesec B. and the Austrian-DRG-Team^{*)}

The Austrian Federal Ministry of Health and Women, Vienna

Introduction

An analysis of the costs of intensive care units (ICU) of Austrian hospitals shows that a very high amount is due to ICU. Whereas in standard hospitals the percentage of the total costs is rather low, the percentage is much more than 10% in specialized or university hospitals. The adequate financing of the ICU's is very important and therefore integrated into the Austrian DRG-system as a special add on. To evaluate the work load and also the necessity for staying in an ICU additional documentation was introduced.

The aim of this study is to analyse the use of ICU's in Austria with respect to improve the actual day based add on ICU-model.

The Austrian ICU-financing model

In the Austrian DRG-model an additional reimbursement per day in an ICU is given. The reimbursement of a stay in an intensive ward depends on the permit of the local government and is based on the following criteria:

- structure quality (personal standards, minimum number of beds,...)
- significance of the procedures performed by the ICU/IMCU.

According to these criteria the intensive wards are classified into different categories (Table 1), whereby the model distinguishes between two main types of intensive care, the intermediate care unit (IMCU) and the intensive care unit (ICU). The ICU is divided in three different levels, whereby level 3 indicates the highest standard of intensive care.

To classify the different types of intensive care in an ICU a special documentation was introduced. This documentation includes TISS-28 (Therapeutic Intervention Scoring System, 28 items) as well as SAPS-II (Simplified Acute Physiology Score II). The TISS-28 items have to be documented for each day the patient will be treated in an ICU, whereby the SAPS-II items have to be documented at least at the day of admission to this ICU. The TISS-28 to some extent reflects the necessary work load as well as special procedures whereas the SAPS-II can be considered as an indicator for the risk of survival and therefore for the necessity of the use of an intensive care ward. For neonatologic and pediatric ICU's a special documentation and classification is used.

At the moment the reimbursement is based on days according to the categories. Table 1 shows the conditions for the classification as well as the scores for each of the four categories:

Type of ICU	Minimum number of beds	Number of nurses per bed	Average TISS-28	Scores per day
IMCU	4	≥ 1.5	No documentation	322
ICU I	6	≥ 2.0	≥ 22	504
ICU II	6	≥ 2.5	≥ 27	721
ICU III	6	≥ 3.0	≥ 32	1153

Table 1: Personal standards, equipment and DRG-scores for the Austrian ICU financing model

Data Base

For the analysis we used data from the year 2003, whereby in 210 intensive wards TISS-28 and SAPS-II was documented. The quality of the documentation was rather good, not least because of the use of the data for prospective reimbursement. Altogether we got the data about 96.622 intensive care stays with 464.778 documented days in an intensive ward.

For the year 2003 the matching between diagnosis- and procedure-data with the documentation of the ICU/IMCU was done by using certain patient-related parameters like hospital number, ward number, date of admission and date of birth. With this method we could find out the related diagnosis and procedures for 83.512 intensive care stays it is about 86,4 %. The remaining 13,6 % could not be matched, because some hospitals used different non corresponding documentation systems for the diagnoses / procedures on one hand and the intensive documentation on the other hand. Beginning with 2005 the different documentations have to be reported in a common dataset and a complete linkage will be possible.

Usage of intensive care for selected main diagnoses

Table 2 shows the results for the 10 most often documented main diagnosis in an intensive ward regarding to the TISS-28 score and the length of stay (LOS). It can be seen that a rather large amount of hospital days for this diagnoses will be spent in ICU's. The variation of the TISS-28 depends very much on the main diagnosis.

ICD-10	text	#stays	%stays (ICU/IMCU:Total)	Mean TISS-28	Mean LOS
I25	Chronic ischaemic heart disease	6.423	17,2	31,3	3,6
I21	Acute myocardial infarction	5.860	40,5	22,0	4,1
I50	Heart failure	1.925	8,0	25,9	4,8
I20	Angina pectoris	1.875	13,9	20,8	3,1
S72	Fracture of femur	1.873	11,9	26,8	3,6
C18	Malignant neoplasm of colon	1.630	7,9	30,5	5,1
S06	Intracranial injury	1.544	6,3	32,9	8,7
I35	Nonrheumatic aortic valve disorders	1.430	39,9	34,5	4,0
I48	Atrial fibrillation and flutter	1.320	9,2	17,4	2,4
J18	Pneumonia, organism unspecified	1.201	4,8	28,4	7,5

Table 2: Use of intensive ward by ICD-10 main diagnosis

Usage of intensive care for selected procedures

Out from the additional documentation and also the Austrian catalogue of procedures detailed information about the type of care in ICU's can be derived. In many DRG system respirator therapy is considered as the very important decision criterion for ICU usage and reimbursement. But we think, that this is not the only one necessary and sufficient criterion.

Table 3 shows the results for the 10 most often documented procedures in an intensive ward regarding to the TISS-28 score and the length of stay (LOS).

Procedure	text	#stays	%stays (ICU/IMCU:Total)	Mean TISS-28	Mean LOS
6837	Physiotherapy	34.961	9,5	31,3	6,3
6261	(3-D)- Computer tomography	24.956	8,3	31,1	6,9
6808	Respirator therapy	12.119	67,8	34,0	7,4
6501	Coronary angiography	5.127	13,7	25,2	3,9
6271	Magnetic resonance tomography	4.833	5,4	30,6	6,6
2386	Aortocoronary multiple bypass	3.380	94,6	35,8	3,7
6266	Computer tomography under anaesthetic	3.174	64,3	36,0	13,5
6723	Autopsy	3.104	30,6	35,6	8,3
6001	Aorto-/ arteriography	3.066	13,1	33,0	5,7
6406	Bronchoscopy	3.024	21,1	35,0	16,9

Table 3: Use of intensive ward by procedure

Examples for the distribution of LOS/TISS-28 score

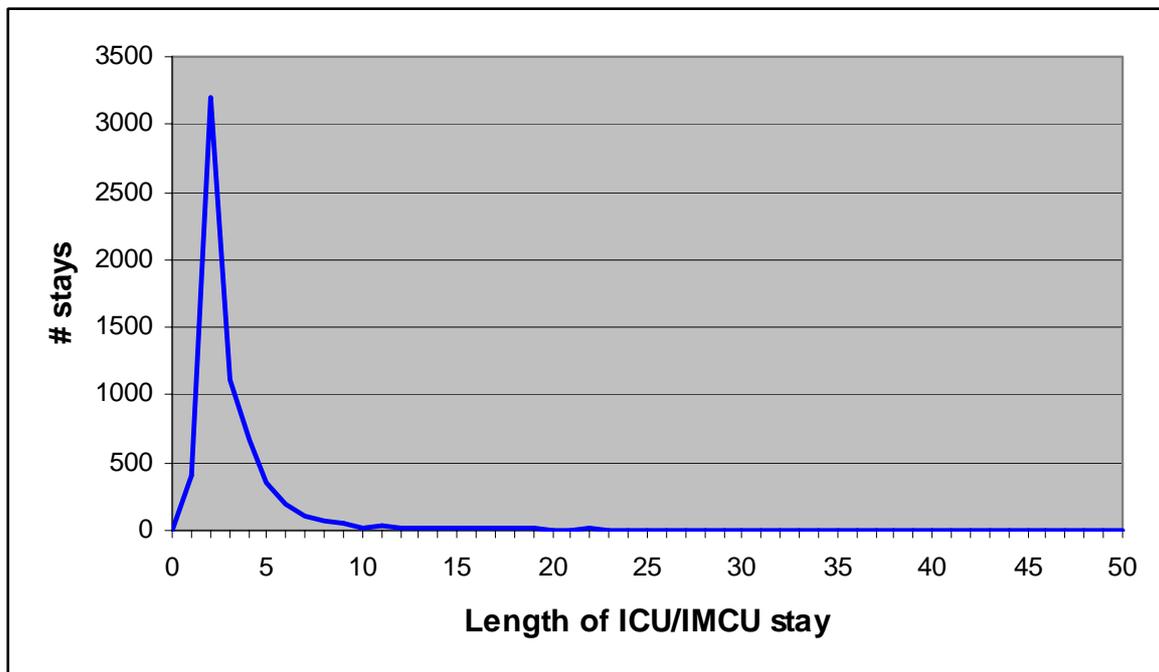


Figure 1: Example of the distribution of the LOS for I25 (Chronic ischaemic heart disease)

Figure 1 shows the distribution of the length of stay belonging to patients with main diagnosis I25. The distribution is not very symmetric and there are a lot of outliers up to the value of 50.

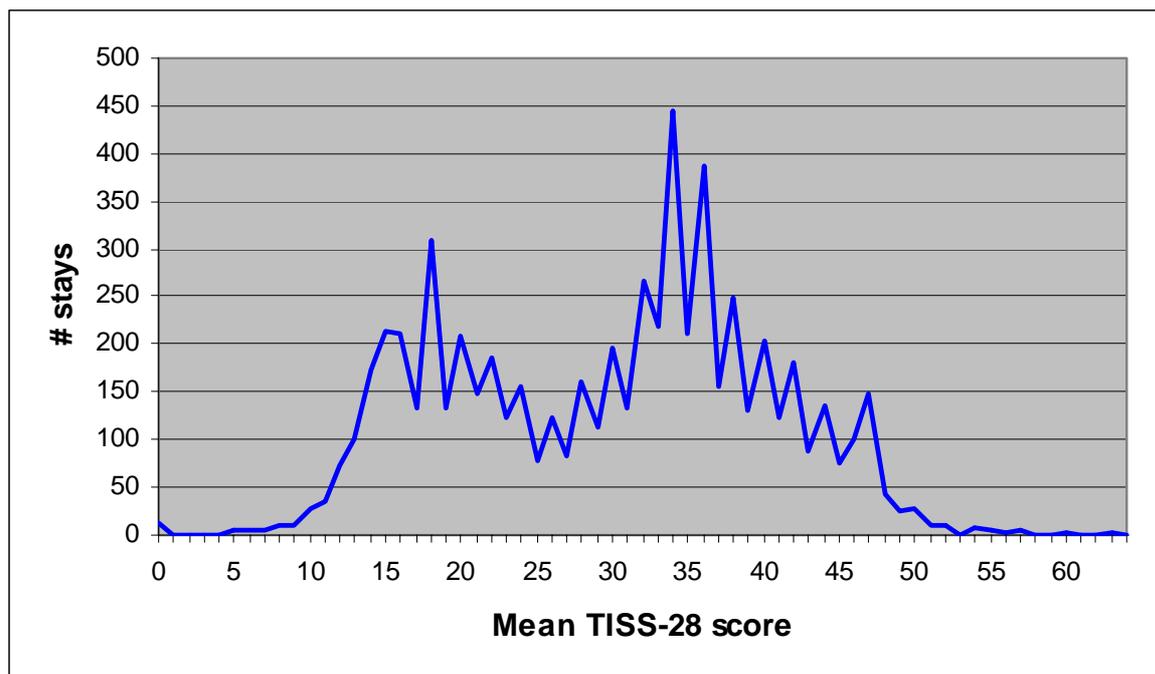


Figure 2: Example of the distribution of the mean TISS-28 for I25 (Chronic ischaemic heart disease)

Figure 2 shows the corresponding distribution of the mean TISS-28 score of patients with main diagnosis I25. The distribution shows at least two peaks, the first one around a TISS-28 value of 18, the second one around a value of 35. Also in this graphic we can identify different outliers in both directions, even stays with a TISS-28 value of 0, which seems not very plausible. The two peaks are very good indicators for the inhomogeneity of the severity within one main diagnosis.

Results

As shown in the example above, we found out that for the most often documented diagnosis in ICU/IMCU there is a high variation concerning the LOS and also the TISS-28 score. Furthermore also the usage of ICU within an Austria DRG or within a main diagnosis shows high variations. A further aspect is that in different types of hospital for the same main diagnosis or Austrian DRG the average TISS can be very different because of the severity of intensive care. Because of this high variation it seems not possible to integrate the reimbursement as a fixed amount into the DRG's.

Further developments and conclusions

The main criticism is that ICU-reimbursement in Austria is based on the length of stay in the ICU but on the other side the analysis has shown that:

- there are only few DRG's where 100% of the patients are in the ICU
- There are only few DRG's where none is in the ICU
- The length of stay in an ICU within a DRG has a very high variation
- The TISS varies substantially over time within a DRG and especially for patients who are very long in an ICU, it may increase substantially.

A further problem is the variation of usage of ICU's between hospitals. Because of the very important role of ICU's for hospital financing the additional documentation of TISS and

SAPS are necessary preconditions for an appropriate modelling of ICU financing. But we are also aware of the problems caused by evaluation of the TISS. This evaluation may have wrong incentives for overuse or at least over-documentation. At the moment 28 items for the TISS are documented. Some of this criteria, like basic monitoring are documented nearly for all ICU days. Therefore a reduction of the number of items seems possible. But on the other hand more than one item, like respiratory therapy are necessary. To achieve a common standard for ICU usage in Austria further analysis of the SAPS, which can be considered as a risk score are necessary.

^{*)}The Austrian DRG-Team: Bartosik W., Egger A., Figl K., Fritz G., Gretzl G., Klingler D., Neuner L., Pesec B., Pfeiffer K., Renner G.