

## **CHAPTER 7**

### **BONE AND TISSUE TRANSPLANTATION**

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#### **Contents**

##### **7.0 Introduction**

##### **7.1 Stock of Bone, Amniotic Membrane and other Tissue Allografts and Hospitals Where Tissues are Utilised**

##### **7.2 Reporting Centres**

##### **7.3 Recipient Details**

##### **7.4 Pre Transplant Data**

##### **7.5 Transplant Surgery Data**

**List of Tables**

Table 7.1.1: Types of Tissue Allografts Supplied by USM Tissue Bank in 2007.....	3
Table 7.1.2: Hospitals/Other Sectors Using Bone/Tendon Allografts in 2007.....	4
Table 7.1.3: Hospitals/Other Sectors Using Amniotic Membranes in 2007.....	5
Table 7.2.1: Distribution of Reporting Centre by Year .....	6
Table 7.3.1: Distribution of Patients by Gender .....	7
Table 7.3.2: Distribution of Patients by Ethnic Group .....	7
Table 7.3.3: Distribution of Patients by Age Group .....	7
Table 7.3.4: Distribution of Patients by Diagnosis Warranting Tissue Graft Transplantation.....	8
Table 7.4.1: Distribution of Patients According to Tissue Provider.....	9
Table 7.4.2: Distribution of Patients by Origin of Tissue Graft.....	9
Table 7.4.3: Distribution of Tissue Graft Used by Type.....	9
Table 7.4.4: Distribution of Type of Sterilisation of the Graft .....	9
Table 7.4.5: Distribution of Mode of Transport Storage to Recipient Hospital during Transportation .....	10
Table 7.4.6: Distribution of Temperature of Storage during Transportation.....	10
Table 7.5.1: Distribution of Mode of Storage in Recipient Hospitals .....	11
Table 7.5.2: Distribution of Additional Tissue Usage (Composite Graft).....	11
Table 7.5.3: Distribution of Type of Additional Tissue Used (Composite Graft).....	11
Table 7.5.4: Distribution of Presence of Pre Operative Infection at Implant Site .....	11
Table 7.5.5: Distribution of Pre Implant Graft Culture Swab.....	12
Table 7.5.6: Distribution of Type of Infection of Pre Implant Graft .....	12
Table 7.5.7: Distribution of Grafts Soaked in Antibiotics Prior to Transplantation.....	12
Table 7.5.8: Distribution of Antibiotics Used to Soak the Grafts in Prior to Transplantation.....	12
Table 7.5.9: Distribution of Patients by Systemic Antibiotics Given Prior to Transplantation.....	12
Table 7.5.10: Distribution of Patients by Type of Systemic Antibiotics Given Prior to Transplantation.....	13

## **7.0 INTRODUCTION**

This chapter presents data provided by centres that distributed tissue allografts, data about recipient centres and data provided on the Bone and Tissue Transplant Notification Form by surgeons. Only Universiti Sains Malaysia (USM) Tissue Bank provided information on tissue allografts that had been supplied and data on bone and other tissue allograft transplantation is still lacking. Thus, the report does not reflect the actual magnitude of transplant activity in the country.

The limited data that were notified to NTR has restricted further analysis and definitive conclusions could not be made. Data relating to recipients pre and post transplantation depends on factors such as location of hospitals and surgeons' expertise/experience and preference in tissue transplantation.

However a continuous effort has to be made to ensure that all cases of bone and tissue allograft transplantation are reported as the data would be useful in assisting the Ministry of Health, non-governmental organisations, private providers and industry in planning and evaluation of the tissue transplant programme and service.

**7.1 STOCK OF BONE, AMNIOTIC MEMBRANE AND OTHER TISSUE ALLOGRAFTS AND HOSPITALS WHERE TISSUES ARE UTILISED IN 2007**

In 2007 data was only provided by USM Tissue Bank, as a centre that supplied tissues. The main tissue allografts that were distributed were amniotic membranes and deep-frozen femoral heads (Table 7.1.1). Majority on the bone/tendon allografts were provided to private hospitals and other sectors and to the Ministry of Health hospitals (Table 7.1.2). The amniotic membranes were mainly used by surgeons in Ministry of Health hospitals (Table 7.1.3).

Table 7.1.1: Types of Tissue Allografts Supplied by USM Tissue Bank in 2007

<b>Types of Tissue Allograft</b>	<b>No. (pieces)</b>
DF Femur	2
DF Femoral head	65
DF Humerus	2
DF Tibia	4
DF Radius	0
DF Ulna	0
FD Cancellous	2
FD Cortical	0
FD Cortico-cancellous	0
Other FD Bones	8
Patella	2
Achilles	2
Other tendon / fascia / cartilage	3
Amniotic membranes	175
<b>TOTAL</b>	<b>265</b>

DF – Deep-frozen

FD – Freeze-dried

Table 7.1.2: Hospitals/Other Sectors Using Bone/Tendon Allografts in 2007

	<b>USM Tissue Bank</b>
	<b>No. (pieces)</b>
<b>Ministry of Health Hospitals</b>	
Hospital Sultanah Aminah, Johor Bahru	1
Hospital Melaka	3
Hospital Pulau Pinang	10
Hospital Raja Permaisuri Bainun, Ipoh	3
Hospital Sultanah Bahiyah, Alor Setar	2
Hospital Umum Sarawak, Kuching	6
Queen Elizabeth Hospital, Kota Kinabalu	2
<b>TOTAL</b>	<b>27</b>
<b>University Hospitals</b>	
HUKM	5
HUSM	3
<b>TOTAL</b>	<b>8</b>
<b>Private and other sectors</b>	
Amin Dental Surgery, Johor Bahru	5
Chong Dental Surgery, Seri Kembangan Selangor	1
Hospital Fatimah, Ipoh	2
Hospital Sultan Ismail, Johor Bahru	2
Hospital Tawakal, Kuala Lumpur	3
Johnson & Johnson Medical	2
Kemajuan Abadi Sdn. Bhd.	2
Klinik Pergigian Chong, Tangkak, Johor	1
Normah Medical Center, Kuching	1
Stryker	12
Zimmer	21
<b>TOTAL</b>	<b>52</b>

Table 7.1.3: Hospitals/Other Sectors Using Amniotic Membranes in 2007

	<b>USM Tissue Bank</b>
	<b>No. (pieces)</b>
<b>Ministry of Health Hospitals</b>	
Hospital Kuala Lumpur	40
Hospital Sultan Ismail, Johor Bahru	50
Hospital Miri, Sarawak	5
Hospital Sultanah Bahiyah, Alor Setar	7
Hospital Pulau Pinang	3
Hospital Sultanah Nurzahirah, Kuala Terengganu	5
Hospital Sungai Buloh, Selangor	21
Hospital Teluk Intan, Perak	4
Hospital Raja Perempuan Zainab II, Kota Bharu	2
Hospital Umum Sarawak, Kuching	6
Hospital Queen Elizabeth, Kota Kinabalu	1
<b>TOTAL</b>	<b>144</b>
<b>University Hospitals</b>	
HUKM	7
HUSM	7
IIUM	6
<b>TOTAL</b>	<b>20</b>
<b>Private and other sectors</b>	
Puteri Specialist Hospital, Johor Bahru	5
ISEC Sdn. Bhd.	2
Kuala Terengganu Specialist Center, Kuala Terengganu	3
Putra Medical Centre, Alor Setar	1
<b>TOTAL</b>	<b>11</b>

## 7.2 REPORTING CENTRES

The recipient centres that reported to the National Transplant Registry using the Bone and Tissue Transplant Notification Form are shown on Table 7.2.1. Even though the number of reporting centres in 2007 has not decreased compared to previous years, some of the surgeons had submitted incomplete forms.

Table 7.2.1: Distribution of Reporting Centre by Year

Centre	2004	2005	2006	2007	TOTAL
	No.	No.	No.	No.	
<b>Orthopaedics Department</b>					
Department of Orthopaedics, HUSM	1	7	2	1	11
Department of Orthopaedic Surgery, UMMC	1	0	0	0	1
Institute of Orthopaedics & Traumatology, HKL	2	0	0	0	2
Department of Orthopaedics, Hospital Ipoh	0	1	0	0	1
Department of Orthopaedics, Hospital Kota Bharu	9	3	0	0	12
Department of Orthopaedics, Hospital Umum Sarawak	1	0	1	0	2
Department of Orthopaedics, Hospital Sultanah Aminah, Johor Bahru	0	1	0	0	1
Wan Orthopaedic, Trauma & Sports Injury Centre (WOTSIC), Seremban Specialist Hospital	0	0	2	0	2
Department of Orthopaedics, Hospital Island, Penang	0	1	0	0	1
Department of Orthopaedics, Hospital Fatimah, Ipoh	0	3	0	1	4
Department of Orthopaedics, Hospital Kuantan	0	0	0	1	1
Department of Orthopaedics, Kota Bharu Medical Centre	0	0	2	0	2
Department of Orthopaedics, Hospital Pulau Pinang	0	0	0	1	1
Normah Medical Specialist Centre, Kuching	0	1	0	0	1
Spine Unit, HUSM	0	0	1	0	1
<b>Ophthalmology Department</b>					
Department of Ophthalmology, Hospital Tengku Ampuan Rahimah, Klang	1	1	0	0	2
Department of Ophthalmology, Hospital Tengku Ampuan Afzan, Kuantan	1	1	0	0	2
Department of Ophthalmology, Hospital Teluk Intan	0	0	1	0	1
Department of Ophthalmology, HKL	0	0	23	20	43
Department of Ophthalmology, Hospital Alor Setar	0	0	1	0	1
Department of Ophthalmology, Hospital Sungai Buloh	0	0	0	9	9
Department of Ophthalmology, Sri Kota Medical Centre	0	1	0	0	1
Department of Ophthalmology, HUSM	0	0	1	2	3
<b>Others Department</b>					
Maxillofacial Surgery, HUSM	1	1	0	0	2
Timberland Medical Centre	0	1	0	0	1
Sri Kota Medical Centre, Klang	0	0	1	0	1
Pantai Medical Centre, Kuala Lumpur	0	0	0	1	1
<b>TOTAL</b>	<b>17</b>	<b>22</b>	<b>35</b>	<b>36</b>	<b>110</b>

**7.3 RECIPIENT DETAILS**

The bone and tissue allografts recipients' gender (Table 7.3.1), ethnicity (Table 7.3.1), age (Table 7.3.3) and diagnosis (Table 7.3.4) are presented in this section.

Table 7.3.1: Distribution of Patients by Gender

Gender	2004		2005		2006		2007		TOTAL	
	No.	%	No.	%	No.	%	No.	%	No.	%
Male	9	53	10	45	27	77	21	58	67	61
Female	8	47	12	55	8	23	15	42	43	39
<b>TOTAL</b>	<b>17</b>	<b>100</b>	<b>22</b>	<b>100</b>	<b>35</b>	<b>100</b>	<b>36</b>	<b>100</b>	<b>110</b>	<b>100</b>

Table 7.3.2: Distribution of Patients by Ethnic Group

Ethnic Group	2004		2005		2006		2007		TOTAL	
	No.	%	No.	%	No.	%	No.	%	No.	%
Malay	11	65	14	64	26	74	18	50	69	63
Chinese	3	18	5	23	7	20	12	33	27	25
Indian	1	6	1	5	1	3	4	11	7	6
Bumiputra Sabah	0	0	0	0	0	0	0	0	0	0
Bumiputra Sarawak	1	6	0	0	0	0	1	3	2	2
Others	1	6	2	9	1	3	1	3	5	4
<b>TOTAL</b>	<b>17</b>	<b>100</b>	<b>22</b>	<b>100</b>	<b>35</b>	<b>100</b>	<b>36</b>	<b>100</b>	<b>110</b>	<b>100</b>

Table 7.3.3: Distribution of Patients by Age Group

Age Group	2004		2005		2006		2007		TOTAL	
	No.	%	No.	%	No.	%	No.	%	No.	%
0-9	0	0	1	5	4	11	5	14	10	9
10-19	1	6	6	27	2	6	1	3	10	9
20-39	9	53	6	27	16	46	8	22	39	35
40-59	5	29	3	14	8	23	11	30	27	25
≥60	1	6	5	23	4	11	11	31	21	19
Missing	1	6	1	5	1	3	0	0	3	3
<b>TOTAL</b>	<b>17</b>	<b>100</b>	<b>22</b>	<b>100</b>	<b>35</b>	<b>100</b>	<b>36</b>	<b>100</b>	<b>110</b>	<b>100</b>
Mean	35		34		36		42		37	
SD	13		22		19		23		20	
Median	33		26		35		49		36	
Min	15		7		0		0		0	
Max	60		75		75		80		80	



Table 7.3.4: Distribution of Patients by Diagnosis Warranting Tissue Graft Transplantation

Diagnosis	2004		2005		2006		2007		TOTAL	
	No.	%	No.	%	No.	%	No.	%	No.	%
Congenital deformity	1	5	0	0	1	3	1	3	3	3
Infection	0	0	0	0	3	8	3	8	6	5
Trauma	5	28	1	5	6	16	1	3	13	12
Degenerative disease	1	5	2	10	0	0	1	3	4	4
Tumour-benign	5	28	4	20	1	3	1	3	11	10
Tumour-malignant	0	0	6	30	1	3	0	0	7	6
Burn	0	0	1	5	2	5	0	0	3	3
Scald	0	0	0	0	1	3	0	0	1	1
Sports injury	0	0	1	5	0	0	1	3	2	2
Failed primary surgery	1	5	2	10	1	3	2	5	6	5
Ophthalmological	0	0	0	0	16	42	7	19	23	20
Others	5	28	3	15	6	16	20	54	34	30
<b>TOTAL</b>	<b>18</b>	<b>100</b>	<b>20</b>	<b>100</b>	<b>38</b>	<b>100</b>	<b>37</b>	<b>100</b>	<b>113</b>	<b>100</b>

Note: 5 patients with 2 diagnosis and 2 missing diagnosis.

## 7.4 PRE TRANSPLANT DATA

This section presents data on the tissue provider (Table 7.4.1), origin of tissue graft (Table 7.4.2), tissue graft type (Table 7.4.3), type of sterilisation of the graft (Table 7.4.4), mode of transport storage of tissue graft to recipient hospital (Table 7.4.5) and temperature of storage tissue graft during transportation (Table 7.4.6).

Table 7.4.1: Distribution of Patients According to Tissue Provider

Name Tissue Bank	2004		2005		2006		2007		TOTAL	
	No.	%	No.	%	No.	%	No.	%	No.	%
USM Tissue Bank	13	76	18	82	31	89	34	94	96	87
Bone Bank, UMMC	1	6	0	0	0	0	0	0	1	1
Bone Bank, HKL	3	18	0	0	0	0	0	0	3	3
Eucara Pharmaceutical	0	0	0	0	2	6	0	0	2	2
Osteo Tech Inc	0	0	1	5	0	0	0	0	1	1
Missing	0	0	3	14	2	6	2	6	7	6
<b>TOTAL</b>	<b>17</b>	<b>100</b>	<b>22</b>	<b>100</b>	<b>35</b>	<b>100</b>	<b>36</b>	<b>100</b>	<b>110</b>	<b>100</b>

Table 7.4.2: Distribution of Patients by Origin of Tissue Graft

Origin of Tissue Graft	2004		2005		2006		2007		TOTAL	
	No.	%	No.	%	No.	%	No.	%	No.	%
Local	17	100	15	68	31	89	34	94	97	88
Imported	0	0	3	14	2	6	0	0	5	5
Missing	0	0	4	18	2	6	2	6	8	7
<b>TOTAL</b>	<b>17</b>	<b>100</b>	<b>22</b>	<b>100</b>	<b>35</b>	<b>100</b>	<b>36</b>	<b>100</b>	<b>110</b>	<b>100</b>

Table 7.4.3: Distribution of Tissue Graft Used by Type

Tissue Graft Type		2004		2005		2006		2007		TOTAL	
		No.	%	No.	%	No.	%	No.	%	No.	%
Deep-frozen tissues	Femur	3	25	3	10	0	0	0	0	6	5
	Femoral Head	2	17	12	41	2	6	7	18	23	20
	Humerus	0	0	1	4	3	10	0	0	4	4
	Tibia	1	7	1	4	1	3	0	0	3	3
	Radius	2	17	5	17	0	0	0	0	7	6
Freeze-dried/ Air-dried	Amniotic membranes	2	17	3	10	25	78	31	82	61	55
Not Available		2	17	2	7	0	0	0	0	4	4
Missing		0	0	2	7	1	3	0	0	3	3
<b>TOTAL</b>		<b>12</b>	<b>100</b>	<b>29</b>	<b>100</b>	<b>32</b>	<b>100</b>	<b>38</b>	<b>100</b>	<b>111</b>	<b>100</b>

Table 7.4.4: Distribution of Type of Sterilisation of the Graft

Type Graft Sterilisation	2004		2005		2006		2007		TOTAL	
	No.	%	No.	%	No.	%	No.	%	No.	%
Gamma Irradiation	16	94	15	68	30	86	27	75	88	80
Glycerol	0	0	0	0	2	6	0	0	2	2
Sterile Freeze Dried Bone	0	0	1	5	0	0	0	0	1	1
Missing	1	6	6	27	3	8	9	25	19	17
<b>TOTAL</b>	<b>17</b>	<b>100</b>	<b>22</b>	<b>100</b>	<b>35</b>	<b>100</b>	<b>36</b>	<b>100</b>	<b>110</b>	<b>100</b>

Table 7.4.5: Distribution of Mode of Transport Storage to Recipient Hospital during Transportation

Mode of Transport Storage to recipient hospital	2004		2005		2006		2007		TOTAL	
	No.	%	No.	%	No.	%	No.	%	No.	%
By Flight	1	6	1	5	2	6	2	5	6	5
By Courier	2	12	3	14	24	69	23	64	52	47
By Hand	4	24	8	36	1	3	0	0	13	12
Dry Ice Box	5	29	4	18	0	0	0	0	9	8
Sterile package	0	0	0	0	2	6	0	0	2	2
Missing	5	29	6	27	6	17	11	31	28	26
<b>TOTAL</b>	<b>17</b>	<b>100</b>	<b>22</b>	<b>100</b>	<b>35</b>	<b>100</b>	<b>36</b>	<b>100</b>	<b>110</b>	<b>100</b>

Table 7.4.6: Distribution of Temperature of Storage during Transportation

Temperature of storage during transportation (°C)	2004		2005		2006		2007		TOTAL	
	No.	%	No.	%	No.	%	No.	%	No.	%
-80	2	12	0	0	0	0	0	0	2	2
-40	0	0	1	5	0	0	0	0	1	1
-20	4	23	4	18	0	0	1	3	9	8
-10	0	0	6	27	2	6	1	3	9	8
0	2	12	0	0	0	0	0	0	2	2
37	0	0	0	0	2	6	0	0	2	2
Room Temperature	3	18	4	18	25	71	22	61	54	49
Missing	6	35	7	32	6	17	12	33	31	28
<b>TOTAL</b>	<b>17</b>	<b>100</b>	<b>22</b>	<b>100</b>	<b>35</b>	<b>100</b>	<b>36</b>	<b>100</b>	<b>110</b>	<b>100</b>

## 7.5 TRANSPLANT SURGERY DATA

The data on mode of storage of tissues in recipient hospitals are presented in Table 7.5.1. This section also presents the data on the use of composite graft (Tables 7.5.2 and 7.5.3), presence of pre operative infection at implant site (Table 7.5.4), presence of infection of pre implanted grafts (Tables 7.5.5 and 7.5.6) and the usage of antibiotics (Tables 7.5.7, 7.5.8, 7.5.9, and 7.5.10).

Table 7.5.1: Distribution of Mode of Storage in Recipient Hospitals

Mode of storage in recipient hospital	2004		2005		2006		2007		TOTAL	
	No.	%	No.	%	No.	%	No.	%	No.	%
Refrigerator	0	0	1	5	25	71	28	78	54	49
Deep freezer-20 °C	0	0	3	14	2	6	3	8	8	7
Deep freezer-40 °C	1	6	2	9	0	0	0	0	3	3
Deep freezer-80 °C	3	18	4	18	1	3	1	3	9	8
Glycerol	0	0	1	5	3	9	4	11	8	7
Room temperature	0	0	1	5	1	3	0	0	2	2
Others	12	71	5	23	2	6	0	0	19	17
Not available	1	6	0	0	0	0	0	0	1	1
Missing	0	0	5	23	1	3	0	0	6	6
<b>TOTAL</b>	<b>17</b>	<b>100</b>	<b>22</b>	<b>100</b>	<b>35</b>	<b>100</b>	<b>36</b>	<b>100</b>	<b>110</b>	<b>100</b>

Table 7.5.2: Distribution of Additional Tissue Usage (Composite Graft)

Additional tissue usage (composite graft)	2004		2005		2006		2007		TOTAL	
	No.	%	No.	%	No.	%	No.	%	No.	%
No	6	35	12	55	32	91	33	92	83	75
Yes	9	53	7	32	1	3	2	5	19	17
Not available	2	12	1	5	0	0	0	0	3	3
Missing	0	0	2	9	2	6	1	3	5	5
<b>TOTAL</b>	<b>17</b>	<b>100</b>	<b>22</b>	<b>100</b>	<b>35</b>	<b>100</b>	<b>36</b>	<b>100</b>	<b>110</b>	<b>100</b>

Table 7.5.3: Distribution of Type of Additional Tissue Used (Composite Graft)

Type of additional tissue used (composite graft)	2004		2005		2006		2007		TOTAL	
	No.	%	No.	%	No.	%	No.	%	No.	%
Autografts	7	78	3	43	0	0	0	0	10	53
Allografts	1	11	2	29	1	100	2	100	6	32
Others	1	11	1	14	0	0	0	0	2	10
Missing	0	0	1	14	0	0	0	0	1	5
<b>TOTAL</b>	<b>9</b>	<b>100</b>	<b>7</b>	<b>100</b>	<b>1</b>	<b>100</b>	<b>2</b>	<b>100</b>	<b>19</b>	<b>100</b>

Table 7.5.4: Distribution of Presence of Pre Operative Infection at Implant Site

Presence of pre operative infection at implant site	2004		2005		2006		2007		TOTAL	
	No.	%	No.	%	No.	%	No.	%	No.	%
No	15	88	21	95	31	89	27	75	94	85
Yes	0	0	0	0	4	11	9	25	13	12
Not Available	2	12	0	0	0	0	0	0	2	2
Missing	0	0	1	5	0	0	0	0	1	1
<b>TOTAL</b>	<b>17</b>	<b>100</b>	<b>22</b>	<b>100</b>	<b>35</b>	<b>100</b>	<b>36</b>	<b>100</b>	<b>110</b>	<b>100</b>

Table 7.5.5: Distribution of Pre Implant Graft Culture Swab

Pre implant graft culture swab	2004		2005		2006		2007		TOTAL	
	No.	%	No.	%	No.	%	No.	%	No.	%
No	15	88	16	73	17	49	22	61	70	63
Yes	0	0	1	5	0	0	1	3	2	2
Not Available	2	12	0	0	6	17	5	14	13	12
Missing	0	0	5	23	12	34	8	22	25	23
<b>TOTAL</b>	<b>17</b>	<b>100</b>	<b>22</b>	<b>100</b>	<b>35</b>	<b>100</b>	<b>36</b>	<b>100</b>	<b>110</b>	<b>100</b>

Table 7.5.6: Distribution of Type of Infection of Pre Implant Graft

Type of infection of pre implant graft	2004		2005		2006		2007		TOTAL	
	No.	%	No.	%	No.	%	No.	%	No.	%
Cytomegalovirus	0	0	1	100	0	0	0	0	1	50
Proteus	0	0	0	0	0	0	1	100	1	50
<b>TOTAL</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>100</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>100</b>	<b>2</b>	<b>100</b>

Table 7.5.7: Distribution of Grafts Soaked in Antibiotics Prior to Transplantation

Grafts soaked in antibiotics prior to transplantation	2004		2005		2006		2007		TOTAL	
	No.	%	No.	%	No.	%	No.	%	No.	%
No	8	47	5	23	28	80	28	78	69	62
Yes	7	41	16	73	6	17	6	17	35	32
Not Available	2	12	0	0	1	3	0	0	3	3
Missing	0	0	1	5	0	0	2	5	3	3
<b>TOTAL</b>	<b>17</b>	<b>100</b>	<b>22</b>	<b>100</b>	<b>35</b>	<b>100</b>	<b>36</b>	<b>100</b>	<b>110</b>	<b>100</b>

Table 7.5.8: Distribution of Antibiotics Used to Soak the Grafts in Prior to Transplantation

Antibiotics used to soak the grafts in prior to transplantation	2004		2005		2006		2007		TOTAL	
	No.	%	No.	%	No.	%	No.	%	No.	%
Ceftriazone	4	57	9	56	3	50	0	0	16	46
Gentamycin	3	43	4	25	3	50	4	66	14	40
Ceftriazone and Gentamycin	0	0	0	0	0	0	1	17	1	3
Vancomycin, Postome iodine	0	0	1	6	0	0	0	0	1	3
Povidone iodine, Ceftriazone	0	0	1	6	0	0	0	0	1	3
Missing	0	0	1	6	0	0	1	17	2	5
<b>TOTAL</b>	<b>7</b>	<b>100</b>	<b>16</b>	<b>100</b>	<b>6</b>	<b>100</b>	<b>6</b>	<b>100</b>	<b>35</b>	<b>100</b>

Table 7.5.9: Distribution of Patients by Systemic Antibiotics Given Prior to Transplantation

Systemic antibiotics prior to transplantation	2004		2005		2006		2007		TOTAL	
	No.	%	No.	%	No.	%	No.	%	No.	%
No	4	24	3	14	26	74	26	72	59	54
Yes	12	71	17	77	9	26	10	28	48	43
Not Available	1	6	0	0	0	0	0	0	1	1
Missing	0	0	2	9	0	0	0	0	2	2
<b>TOTAL</b>	<b>17</b>	<b>100</b>	<b>22</b>	<b>100</b>	<b>35</b>	<b>100</b>	<b>36</b>	<b>100</b>	<b>110</b>	<b>100</b>

Table 7.5.10: Distribution of Patients by Type of Systemic Antibiotics Given Prior to Transplantation

Type of systemic antibiotics given to patient prior to transplantation	2004		2005		2006		2007		TOTAL	
	No.	%	No.	%	No.	%	No.	%	No.	%
Cefepirone	2	17	2	12	0	0	0	0	4	9
Ceftriazone	0	0	0	0	1	11	0	0	1	2
Cefuroxime	7	58	7	40	4	45	2	25	20	44
Ciproflaxacin	0	0	2	12	0	0	2	25	4	9
Chloramphenicol	0	0	0	0	1	11	0	0	1	2
Metronidazole	1	8	1	6	0	0	0	0	2	4
Ceftazidime	0	0	0	0	1	11	0	0	1	2
Ceftriazone/Imipenam	2	17	2	12	2	22	2	25	8	18
Ampicillin/Sulbactam	0	0	0	0	0	0	1	12	1	2
T. Augmentin	0	0	0	0	0	0	1	12	1	2
T. Fluriazole	0	0	2	12	0	0	0	0	2	4
Missing	0	0	1	6	0	0	0	0	1	2
<b>TOTAL</b>	<b>12</b>	<b>100</b>	<b>17</b>	<b>100</b>	<b>9</b>	<b>100</b>	<b>8</b>	<b>100</b>	<b>46</b>	<b>100</b>