

MEDICAL GRAND ROUNDS

PARKLAND MEMORIAL HOSPITAL

November 20, 1969

SURGERY AND BACTERIAL ENDOCARDITIS

CASE 1. This patient was a 23 year old man hospitalized in [REDACTED] 1963 because of protracted fever. He had been hospitalized in 1960 and had patch closure of an atrial septal defect. He did well until [REDACTED] 1962 when he developed an acute episode of fever and chest pain associated with bilateral pulmonary infiltrates. He was treated with chloramphenicol and erythromycin, and improved slowly. Blood cultures were taken but not until he had been on drugs for several days and they proved to be negative. In the subsequent 9 months he had four more episodes of fever and chest pain responsive to antibiotics. He was rehospitalized in [REDACTED] 1963 because of another episode and this time several blood cultures were positive for *Staphylococcus aureus*. A diagnosis of bacterial endocarditis seemed tenable in view of the protracted course and the persistent bacteremia in the absence of other foci of infection. He was treated with methicillin for four weeks and has remained well subsequently.

CASE 2. This 29 year old man was first admitted to the hospital in 1961 for rheumatic heart disease and congestive heart failure. In [REDACTED] 1961 he had open heart surgery with repair of the aortic valve with a Bahnson cusp. Immediately postoperatively he was afebrile and had no aortic murmur. On the seventh day an aortic diastolic murmur appeared. On the 14th day he had fever, and two blood cultures yielded coagulase negative staphylococci. He was given chloramphenicol for 10 days. He was discharged home and during the subsequent month had what was thought to be hepatitis. In [REDACTED] he developed high fever and blood cultures repeatedly were positive for coagulase negative staphylococci. He was treated with vancomycin for four weeks and appeared to do well during therapy but promptly relapsed. He was treated again for four weeks with methicillin and again seemed to do well but again relapsed a few days post-treatment. He refused further injections and accordingly was given oxacillin 6 gm. orally every day. He became afebrile and blood cultures remained negative but heart failure became uncontrollable and after four weeks of therapy he was reoperated. A mycotic aneurysm of the non-coronary sinus was resected and a patch sewed in place. The aortic valve was reconstructed with 3 Bahnson cusps (pump time 5 hours). He did very well postoperatively and was treated with antibiotics for only 10 days. He has remained well.

CASE 3. This 55 year old man had mitral valvulotomies in 1954 and 1958. In [REDACTED] 1966 a mitral disc prosthesis was placed. He apparently did well until [REDACTED] 1967 when he began to have fever and developed increasing signs of congestive heart failure. He had one subungual hemorrhage, and an episode of swelling and redness over the left ankle. He also had microscopic hematuria. Blood cultures were negative. His condition deteriorated rapidly with continued fever and increasing congestive failure and he expired [REDACTED] 1968. At post-mortem he was found to have a myocardial abscess, and arising from this a large vegetation which extended into and nearly occluded the aortic valve. Culture of the abscess yielded *Aspergillus niger*. Sections of the vegetations showed many septate hyphae compatible with *Aspergillus*.

CASE 4. This 61 year old man was admitted to the hospital on [REDACTED]/63 with severe pain in the left leg and foot of three hours duration. He had signs of left femoral artery occlusion, but the remainder of his physical examination including the cardiac examination was normal. At surgery an unusually firm embolus was removed from the left common femoral artery. A Gomori methenamine silver stain of the tissue revealed budding yeast forms and branching septate mycelia. No culture was done. Fluorescent antibody staining of the tissue gave positive results with *H. capsulatum* antiserum. A candida control was negative. Blood, urine and bone marrow cultures were negative. Serum complement fixation with histoplasmin was positive 1:64.

Patient was treated with 4 gm. of amphotericin B and has remained well. The serum complement fixation test became negative after 15 months.

CASE 5. This 46 year old man was hospitalized [REDACTED]/67 because of fever. Fever had started in [REDACTED] 1966 and he was found then to have a right renal stone and a urinary tract infection. He also had an abscessed tooth at this time. Both of these problems were treated surgically but post-operatively he did poorly, and continued febrile. In [REDACTED] 1967 an aortic diastolic murmur was noted for the first time. On admission he had fever, signs of dynamic aortic insufficiency, and was in congestive heart failure. Blood cultures yielded viridans streptococci.

He was treated for his congestive heart failure and given penicillin and streptomycin. His heart failure continued to be a problem. On [REDACTED]/67, after 28 days of penicillin therapy, he was operated.

One cusp of the aortic valve was destroyed and another showed a large central perforation. The remnants of valve were excised and a Cutter ball valve placed. He has done well since then. The heart is now of normal size and he does not require digitalis or diuretics.

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TABLE 1.

Frequency of positive blood cultures associated with various procedures.

<u>Procedure</u>	<u>Percentage of patients with positive blood cultures</u>
Tooth extraction	32-75%
Rocking tooth in socket (gum disease)	86%
Brushing teeth	40%
Urethral surgery	57%
Removal of catheter after urologic surgery	50%
Prostatectomy (urinary tract infected)	57%
Massage of infected prostate	38%
First day post partum	11%

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TABLE 2.

Endocarditis - Presumed portals of entry reported in large series
(excludes cardiectomy).

<u>Author</u>	<u>Composition of Series</u>	<u>Portal</u>
Lerner and Weinstein 1966	100 cases (all types)	Dental 13 Surgery 5
Pankey 1961	167 cases (subacute)	Dental 45 Surgery 46 (includes cath. and cysto.)
Pankey 1961	54 cases (acute)	Surgery 22 (including cutdown)

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TABLE 3.

Enterococcal endocarditis - portal of entry.

<u>Author</u>	<u>Number of cases</u>	<u>Portal</u>
Geraci and Martin	33	Urologic procedures 16
Koenig and Kaye	19	Urologic procedures 5 Ob-Gyn 3

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TABLE 4.

Location of endocarditis lesions in congenital heart disease.

VSD	Right ventricular rim of VSD Pulmonary outflow tract
PDA	Pulmonary artery (usually left)
Pulmonic stenosis	Superior surface of valve orifice Bifurcation of main pulmonary artery
Tetralogy	RV outflow. Ductus (in pulmonary artresia)
Coarctation	Distal to coarctation or on associated bicuspid valve

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TABLE 5.

Endocarditis in congenital heart disease - 181 autopsied cases
(pre antibiotics).

Ventricular septal defect	42%
Patent ductus	29%
Pulmonic stenosis	19%
Bicuspid aortic valve	17%
Tetralogy	12%
Atrial septal defect	0

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TABLE 6.

Valvular involvement vs. pressures on valve. Review of 1024 autopsy cases.

<u>Location of lesions - %</u>		<u>"Resting" pressure on closed valve</u>
Mitral	86%	115 mm Hg
Aortic	55%	72 mm Hg
Tricuspid	19%	24 mm Hg
Pulmonic	1%	5 mm Hg

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TABLE 7.

Post-cardiotomy endocarditis

<u>Series</u>	<u>Procedure</u>	<u>Probable frequency</u>
Taussig et al 1951	Pulmonary stenosis and atresia (1000 cases)	1.8%
Linde and Heins 1960	550 congenital hearts	1.3% 2.5% with bypass
Yeh et al 1957-1966	158 cases without prosthesis 116 cases with prosthesis (excluding ball-valve) 126 cases with ball-valve	2-endocarditis 4-endocarditis 12-endocarditis
Stein et al 1966	288 ball-valve	10-proven cases 7-probable 18-with only one positive culture
Fraser et al 1967	527 (bypass)	2.7% endocarditis (3.9% of cases with ball-valve)

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TABLE 8.

Post-cardiotomy endocarditis - unusual microorganisms

Series	Comments
Amoury	568 open hearts 13 cases of endocarditis (12 Staph albus) (2 also Aspergillus)
Fraser	520 open hearts 14 cases of endocarditis (9 Staph albus)
Geraci	172 cases of all types (operated and non- operated) Of 10 cases due to gram neg. rods, 6 were post- cardiotomy
Resnekov	3 years personal exper- ience with valvulotomy 10 cases due to Staph albus
Linde and Heins	7 cases of endocarditis in 550 surgical cases 2 Achromobacter; 1 coag. neg. Staph; 1 Pseudomonas; 1 Neisseria
Hyun and Collier	4 cases of Candida endocarditis in 9 months of surgery (review of prior literature - total of 9 cases)
Brandt and Swahn	5 cases of Staph albus encountered "in a short time"
Berry et al	3 cases of Flavobacterium sepsis post-op. (contamination of heat exchanger hoses)

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TABLE 9.

Post-cardiotomy endocarditis - outcome

<u>Series</u>	<u>Composition of series</u>	<u>Outcome</u>
Resnekov	10-Staph albus (post-commissurotomy)	7 survived
Berry et al 1963	3-Flavobacteria	3 survived
Herr et al 1965	5-Staphylococcus	5 deaths
Yeh et al 1965-66	14 cases - early post-bypass 4 cases - late post-bypass	2 died before therapy 5 survived 4 survived (1 patch removed)
Amoury et al 1966	13 cases (bypass)	2 cured drugs alone 1 under suppressive therapy 1 cured drugs plus re- operation
Stein et al 1966	17 ball-valves (diagnosis reasonably certain) 18 cases with only one positive culture	6 survived 17 survived
Fraser et al 1967	14 cases (bypass)	1 cured drugs alone 1 cured drugs plus reoperation

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TABLE 10.

Influence of antimicrobial drugs on incidence of bacteremia after tooth extraction.

<u>Drug</u>	<u>Incidence of positive blood culture immediately after procedure</u>
None	85%
Penicillin	53%
Streptomycin	57%
Penicillin + Streptomycin	26%
Chloramphenicol	22%

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TABLE 11.

Evaluation of prophylaxis. Measures adopted by Hughes (1966)

1. Methicillin + penicillin.
2. Dental care for patient.
3. Treatment of urinary tract infection.
4. Topical antibiotics to nose of patient and surgeons.
5. Private room - antiseptically cleansed.
6. Autoclave bed clothing, mattress, stretcher.
7. Sterilization of pressure connectors, etc.
8. Phisohex baths tid for 5 days.
9. Isolation.
10. Prevention of backflow in venous pressure system.
11. Check air flow in operating room.
12. Millipore filter in oxygen line to pump.

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TABLE 12.

Prophylaxis in open heart surgery

Cases treated with penicillin + methicillin or penicillin + oxacillin
(some also received streptomycin)

Total cases = 1321
Endocarditis = 12 cases - 0.9%

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TABLE 13.

Valve damage in bacterial endocarditis.

<u>Series</u>	<u>Comments</u>	
Lerner and Weinstein	25 autopsies	52% had extensive valve damage
Morgan and Bland	92 autopsies	12 ruptured mitral chorda 9 perforated or ruptured
Robinson and Ruedy	166 cases autopsied (pre-antibiotic)	15.6% perforated valves
	101 cases autopsied (post antibiotic)	44.5% perforated valves

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TABLE 14.

Prognostic significance of aortic insufficiency in bacterial endocarditis.

79 cases in series
28 had dynamic aortic insufficiency
9 survived longer than 1 year
7 of 9 survivors had had valve surgery.

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TABLE 15.

Operation in "active" endocarditis.

Series	Clinical features	Result
Kay et al 1961	Candida on tricuspid valve and VSD - excision vegetation and repair	Cure
Kennedy et al 1966	"Active endocarditis" Tricuspid valve excised. Ball-valve implanted.	Apparent cure
Littlefield et al	Pseudomonas on Starr-Edwards valve - new valve inserted	Cure
Robicsek et al	No prior antibiotics. Infected mitral valve excised. Starr-Edwards valve inserted.	Cure (post-op anti-biotics given)
Scott et al	1-pneumococcus - 12th day 1-str. viridans - 10th day Aortic valves excised - Starr-Edwards placed	2 cured post-op antibiotics
Stason et al	13 cases (10 aortic valves) < 6 mo. after start of Rx (one no pre-op Rx; 4-operated during first course)	10 alive and well
Symbas and Parr 1968	Pneumococcal (21st day). Perf. valve. Acquired VSD, aortic-RV shunt	Cure
Wallace et al 1965	Klebsiella - aortic valve excision; Starr-Edwards	Cure
Wilcox et al	1-SE valve, 27th day	Cure
	1-Staph; treatment failure - vegetation excised	Cure
	1-Str. viridans - 5th day; intractable failure; SE mitral - chordae repair	Cure

TABLE 15 - Cont'd.

Operation in "active" endocarditis

<u>Series</u>	<u>Clinical features</u>	<u>Result</u>
Braniff et al 1967	5 cases - 10-54 days after beginning therapy	5 cured
Hurley et al 1967	1 case operated twice: 12 and 60 days after therapy	Cured
Kaiser et al 1967	3 active cases operated	1 cured (3 procedures)
Kay et al 1968	3 new cases - Candida (polyethylene catheters)	2 cured (post operative amphotericin)
Melamed et al 1968	1 case - E. Coli. Foreign body in ventricle (wire)	Cured
Windsor	8 cases attempted (untreated to 3 months after onset)	5 cured

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TABLE 16.

Total reported experience for operation on "active" endocarditis (1969)

Total cases operated	45
Aortic valve	36
Mitral	6
Tricuspid	2
Foreign body	1
Survivors.....	35 (78%)

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