Positive Therapeutic Effects of Intercessory Prayer in a Coronary Care Unit Population

RANDOLPH C. BYRD, MD, San Francisco, Calif

ABSTRACT: The therapeutic effects of intercessory prayer (IP) to the Judeo-Christian God, one of the oldest forms of therapy, has had little attention in the medical literature. To evaluate the effects of IP in a coronary care unit (CCU) population, a prospective randomized double-blind protocol was followed. Over ten months, 393 patients admitted to the CCU were randomized, after signing informed consent, to an intercessory prayer group (192 patients) or to a control group (201 patients). While hospitalized, the first group received IP by participating Christians praying outside the hospital; the control group did not. At entry, chi-square and stepwise logistic analysis revealed no statistical difference between the groups. After entry, all patients had follow-up for the remainder of the admission. The IP group subsequently had a significantly lower severity score based on the hospital course after entry ($P < .01$). Multivariate analysis separated the groups on the basis of the outcome variables ($P < .0001$). The control patients required ventilatory assistance, antibiotics, and diuretics more frequently than patients in the IP group. These data suggest that intercessory prayer to the Judeo-Christian God has a beneficial therapeutic effect in patients admitted to a CCU.

WHO HAS NOT, during a time of illness or pain, cried out to a higher being for help and healing?[1] Praying for help and healing is a fundamental concept in practically all societies, though the object to which these prayers are directed varies among the religions of the world.[1] In western culture, the idea of praying for the benefit of others (intercessory prayer) to the Judeo-Christian God is widely accepted and practiced. However, the medical literature contains no scientific evidence either confirming or negating the healing effectiveness of intercessory prayer. In only a few studies have scientific methods been used to attempt to determine whether or not prayer is therapeutically effective,[2-5] and these studies have been inconclusive.[6]

My study concerning prayer and patients in a general hospital coronary care unit was designed to answer two questions: (1) Does intercessory prayer to the Judeo-Christian God have any effect on the patient's medical condition and recovery while in the hospital? (2) How are these effects characterized, if present?

METHODS

Between August 1982 and May 1983, 393 patients were entered into a prospective double blind randomized protocol to assess the therapeutic effects of intercessory prayer.

All patients admitted to the coronary care unit at San Francisco General Hospital were eligible for entry into the study; 57 patients refused for personal reasons, religious convictions, and/or unwillingness to sign the informed consent.

Before entry, the nature of the project was fully explained to each patient and informed consent was obtained. Patients were randomly assigned (using a computer-generated list) either to receive or not to receive intercessory prayer. The patients, the staff and doctors in the unit, and I remained "blinded", throughout the study. As a precaution against biasing the study, the patients were not contacted again. It was assumed that some of the patients in both groups would be prayed for by people not associated with the study; this was not controlled for. Thus some of the patients in the control group would be prayed for, whereas all of the patients in the prayer group would be (i.e., by both nonassociated people and by the designated intercessors of the study).

For the purposes of this study, intercessors were chosen on the following basis. They were "born again" Christians (according to the Gospel of John 3:3) with an active Christian life as manifested by

TABLE 1. Patients' Status on Entry			
Entry Variables	Intercessory Prayer Group (n = 192)	Control Group (n = 201)	P
Age (mean ± SD)	58.2 ± 14.8	60.1 ± 15.0	NS
Sex: Female	65	63	NS
Male	127	138	NS
Time (days, mean ± SD)*	0.9 ± 1.2	0.9 ± 1.1	NS

Primary Cardiac Diagnosis	%	(No.)	%	(No.)	P
Congestive heart failure	33	(63)	33	(66)	NS
Cardiomegaly	32	(62)	32	(64)	NS
prior myocardial infarction	30	(57)	26	(50)	NS
Acute myocardial infarction	27	(51)	29	(58)	NS
Unstable angina	25	(48)	30	(61)	NS
Chest pain, cause unknown	19	(36)	15	(31)	NS
Acute pulmonary edema	13	(25)	13	(27)	NS
Syncope	11	(21)	6	(12)	NS
Cardiomyopathy	8	(16)	9	(17)	NS
Supraventricular tachyarrhythmia	8	(15)	12	(24)	NS
VT/VF	8	(14)	9	(17)	NS
Intubation/ventilation	6	(11)	10	(19)	NS
Valvular heart disease	5	(8)	8	(15)	NS
Hypotension (systolic <90 torr)	4	(8)	5	(10)	NS
Cardiopulmonary arrest	4	(8)	6	(12)	NS
Third-degree heart block	2	(3)	1	(1)	NS

Primary Noncardiac Diagnosis					
Diabetes mellitus	8	(16)	9	(18)	NS
COPD	8	(15)	10	(19)	NS
Gastrointestinal bleeding	5	(10)	2	(3)	NS
Severe hypertension	5	(10)	7	(13)	NS
Pneumonia	5	(9)	4	(7)	NS
.Chronic renal failure	4	(8)	4	(8)	NS
Trauma	4	(7)	3	(6)	NS
Cerebrovascular accident	4	(7)	2	(4)	NS
Drug overdose	3	(5)	3	(5)	NS
Sepsis	2	(3)	2	(4)	NS
Cirrhosis of the liver	2	(9)	1	(2)	NS
Pulmonary emboli	1	(2)	1	(1)	NS
Systemic emboli	1	(2)	0	(0)	NS
Hepatitis	0	(0)	1	(2)	NS

NS = P > .05. VT/NF = ventricular tachycardia/ventricular fibrillation;
COPD = chronic obstructive pulmonary disease.
*Time from admission to the coronary care unit to randomization.

TABLE 2. Results of Intercessory Prayer			
Study Variable	Intercessory Prayer	Control Group	P
Days in CCU after entry	2.0 ± 2.5	2.4 ± 4.1	NS
Days.in hospital after entry	7.6 ± 8.9	7.6 ± 8.7	NS
Number of discharge medications	3.7 ± 2.2	4.0 ± 2.4	NS

New Problems, Diagnoses, and Therapeutic Events After Entry	%	(No.)	%	(No.)	P
Antianginal agents	11	(21)	10	(19)	NS
Unstable angina	10	(20)	9	(18)	NS
Antiarrhythmics	9	(17)	13	(27)	NS
Coronary angiography	9	(17)	11	(21)	NS
VTNF	7	(14)	9	(17)	NS
Readmissions to CCU	7	(14)	7	(14)	NS
Mortality	7	(13)	9	(17)	NS
Congestive heart failure	4	(8)	10	(20)	<0.01
Inotropic agents	4	(8)	8	(16)	NS
Vasodilators	4	(8)	6	(12)	NS
Supraventricular tachyarrhythmia	4	(8)	8	(15)	NS
Arterial pressure monitoring	4	(7)	8	(15)	NS
Central pressure monitoring	3	(6)	7	(15)	NS
Diuretics	3	(5)	8	(15)	<0.01
Major surgery before discharge	3	(5)	7	(14)	NS
Temporary pacemaker	2	(4)	1	(1)	NS
Sepsis	2	(4)	4	(7)	NS
Cardiopulmonary arrest	2	(3)	7	(14)	<0.01
Third-degree heart block	2	(3)	1	(2)	NS
Pneumonia	2	(3)	7	(13)	<0.01
Hypotension (systolic <90 torr)	2	(3)	4	(7)	NS
Extension of infarction	2	(3)	3	(6)	NS
Antibiotics	2	(3)	9	(17)	<0.01
Permanent pacemaker	2	(3)	1	(1)	NS
Gastrointestinal bleeding	1	(1)	2	(3)	NS
Intubation/ventilation	0	(0)	6	(12)	<0.01

NS = P > .05; VT/NF = ventricular tachycardia or ventricular fibrillation

and entered into a PDP-11 computer for analysis using the Biomedical Data Processing (BMDP) statistical package.[7] The data were analyzed with an unpaired t-test for interval data and a chi square test (or Fisher's exact test when necessary) for categorical data. A stepwise logistic regression was used for the multivariate analysis.[8, 9] Interval data were expressed as the mean ± 1 standard deviation.

RESULTS

Data collected on each patient as he entered into the study (Table 1) revealed the condition of the patient groups at the time informed consent was signed. The 109 patients with acute myocardial infarction had the following Killip's classification class I, 16% (prayer group) vs 16% (control group); class II, 8% vs 10%; class III, 1% vs 1%, and class IV, 2% vs 2% (P = NS). Univariate and multivariate analysis showed no statistical differences between the two groups at entry. Thus, it was concluded that the two groups were statistically inseparable and that results from the analysis of the effects of intercessory prayer would be valid.

After entry, all patients had follow-up for the remainder of the hospitalization. New problems, new diagnoses, and new therapeutic interventions that occurred after entry into the study were recorded and are summarized in Table 2. Of the

daily devotional prayer and active Christian fellowship with a local church. Members of several protestant churches and the Roman Catholic Church were represented among the intercessors. Patients and intercessors were not matched by religion or denomination. After randomization, each patient was assigned to three to seven intercessors. The patients' first name, diagnosis, and general condition, along with pertinent updates in their condition, were given to the intercessors. The intercessory prayer was done outside of the hospital daily until the patient was discharged from the hospital. Under the direction of a coordinator, each intercessor was asked to pray daily for a rapid recovery and for prevention of complications and death, in addition to other areas of prayer they believed to be beneficial to the patient.

DATA ANALYSIS

I collected the information on each patient in a blinded manner, without knowledge of the spiritual status, condition, or ideas of the entrants during the study. Data were subsequently collated

TABLE 3: Results of Scoring the Postentry Hospital Course

Score	Prayer Group (n = 192)	Control Group (n = 201)	P
Good	163	147	
Intermediate	2	10	
Bad	27	44	
			<0.01

Scoring System

Good: Only one of the following: left heart catheterization; mild unstable angina pectoris of less than 6 hours' duration; self-limiting ventricular tachycardia within the first 72 hours of myocardial infarction; supraventricular tachyarrythmia; uncomplicated third-degree heart block requiring temporary pacemaker; mild congestive heart failure without pulmonary edema; no complications at all.

Intermediate: Moderate to severe unstable angina pectoris without infarction, congestive heart failure with pulmonary edema, noncardiac surgery, third-degree heart block requiring permanent pacemaker, pneumonia without congestive heart failure, combination of any two events from the *good* category.

Bad: Nonelective cardiac surgery, readmission to the CCU after a myocardial infarction with unstable angina, extension of initial infarction, cerebrovascular accident, cardiopulmonary arrest, need for artificial ventilator, severe congestive heart failure with pulmonary edema and pneumonia, hemodynamic shock due to sepsis or left ventricular failure, death.

multiple variables measured, congestive heart failure, cardiopulmonary arrest, pneumonia, diuretics, antibiotics, and intubation/ventilation were seen less frequently in the prayer group.

Multivariate analysis of the data using the variables listed in Table 2 revealed a significant difference (P < .0001) between the two groups based on events that occurred after entry into the study. Fewer patients in the prayer group required ventilatory support, antibiotics, or diuretics.

The hospital course after entry was graded *good, intermediate*, or *bad,* based on the following criteria. The course was considered to be *good* if no new diagnoses, problems, or therapies were recorded for the patient or if events occurred that only minimally increased the patient's morbidity or risk of death. The course was considered *intermediate* if there were higher levels of morbidity and a moderate risk of death. The course of patients who had the highest morbidity and risk of death or who died during the study was graded as *bad.* The grades were assigned on the basis of the hospital course alone, and no correlation was made as to the condition of the patient at the time of entry. That is, even a patient whose condition was severely critical at the time of entry received a grade of *good* if no new problems or diagnoses developed after entry, and if the patient recovered without new therapeutic interventions and was discharged home. In patients who had minor problems on entry but subsequently had severe life-threatening complications and prolonged hospitalization, the hospital course received a grade of *bad.*

The scoring used for the three levels is summarized in Table 3. In the prayer group 85% were considered to have a good hospital course after entry vs 73% in the control group. An intermediate grade was given in 1% of the prayer group vs 5% of the controls. A bad hospital course was observed in 14% of the prayer group vs 22% of the controls. A 2 by 3 chi-square analysis of these data gave a *P* value of <.01.

DISCUSSION

In reviewing the social and scientific literature on the efficacy of prayer to the Judeo-Christian God there seems to be no end to articles discussing it but very few articles that actually test for the effects of prayer. The Bible records examples of the effectiveness of prayer in healing in the book of Genesis 20:17, 18; Numbers 12:13; and Acts 28:8.

Roland[10] believed that a work on the effectiveness of prayer by Galton[2] in 1872 represents one of the first applications of statistics to science and one of the first objective studies of prayer. Galton,[3] on reporting the effects of prayer in the clergy, found no salutary effects. He cited a previous work by Guy from which he concluded that prayer for sovereigns in England did not make them live longer than other prominent people of the time.[2] Though perhaps a unique approach for his time, the study suffered greatly in design, as retrospective studies are prone to do. Galton also believed that prayer seemed to be a perfectly reasonable subject for research. But the literature remained silent after this, probably as a result of the furor his comments created at the time.

In 1965 a double-blind clinical trial of the effect of prayer on rheumatic patients was reported by Joyce and Welldon,[4] who studied 19 matched pairs of patients over 18 months, with a crossover between the control group and the prayer group at six months. During the first half of the study, the prayer group did better but in the second half the control group did better. Their results showed no significant differences as a result of prayer. Subsequently, in 1969 Cohipp[5] reported the result of a triple-blind study of the efficacy of prayer on 18 leukemic children. In a randomized trial, his data suggested that prayer had a beneficial effect but it did not reach significance because the number of patients was small and the initial randomization did not produce matching groups, thus nullifying any suggested benefit for the prayer group.

I approached the study of the efficacy of prayer in the following manner suggested by Galton[2]:

There are two lines of research, by either of which we may pursue this inquiry. The one that promises the most trustworthy results is to examine large classes of cases, and to be guided by broad averages; the other, which I will not employ in these pages, is to deal with isolated instances.

Several points concerning the present study should be mentioned. First, prayer by and for the control group (by persons not in conjunction with this study) could not be accounted for. Nor was there any attempt to limit prayer among the controls. Such action would certainly be unethical and probably impossible to achieve. Therefore, "pure" groups were not attained in this study — all of one group and part of the other had access to the intervention under study. This may have resulted in smaller differences observed between the two groups. How God acted in this situation is unknown; i.e., were the groups treated by God as a whole or were individual prayers alone answered? Second, whether patients prayed of themselves and to what degree they held religious convictions was not determined. Because many of the patients were seriously ill, it was not possible to obtain an interview extensive enough to answer these two questions. Furthermore, it was thought that discussions concerning the patients' relationship to God might be emotionally disturbing to a significant number of patients at the time of admission to the coronary care unit, though it was generally noted that almost all patients in the study expressed the belief that prayer probably helped and certainly could not hurt.

The data presented in this report show that the initial randomization resulted in two statistically similar groups as judged by the results of univariate and multivariate analysis. Prayers to the Judeo-Christian God were made on behalf of the patients in the prayer group by "born again" believers in Jesus Christ. Analysis of events after entry into the study showed the prayer group had less congestive heart failure, required less diuretic and antibiotic therapy, had fewer episodes of pneumonia, had fewer cardiac arrests, and were less frequently intubated and ventilated. Even though for these variables the P values were $<.05$, they could not be considered statistically significant because of the large number of variables examined. I used two methods to overcome this statistical limitation: incorporation of the outcome variable into a severity score, and multivariate analysis. Both of these methods produced statistically significant results in favor of the prayer group. The severity score showed that the prayer group had an overall better outcome ($P < .01$) and the multivariate analysis produced a P value of $<.0001$ on the basis of the prayer group's lesser requirements for antibiotics, diuretics, and intubation/ventilation.

In this study I have attempted to determine whether intercessory prayer to the Judeo-Christian God has any effect on the medical condition and recovery of hospitalized patients. I further have attempted to measure any effects, if present, of those prayers. Based on these data there seemed to be an effect, and that effect was presumed to be beneficial.

References

1. Spivak CD: Hebrew prayers for the sick. *Ann Med Hist* 1:83-85, 1917
2. Galton F: Statistical inquiries into the efficacy of prayer. *Fortnightly Rev* 12:125-135, 1872
3. Galton F: *Inquiries into Human Faculty and Its Development.* London Macmillan Co, 1883, pp 277-294
4. Joyce CRB, Welldon RMC: The efficacy of prayer: a double-blind clinical trial. *J Chronic Dis* 18:367-377, 1965
5. Collipp PJ: The efficacy of prayer: a triple blind study. *Med Time* 97:201-204, 1969
6. Rosner F: The efficacy of prayer: scientific vs religious evidence. *J Rev Health* 14:294-298, 1975
7. *Biomedical Data Processing Statistical Software.* Dixon WJ (ed). Berkeley, University of California Press, 1981
8. Press SJ, Wilson S: Choosing between logistic regression and discriminant analysis. *J Am Stat Assoc* 73:699-705, 1978
9. Lee ET: *Statistical Methods for Survival Data Analysis.* Belmont, Lifetime Learning Publications, 1980, pp 338-365
10. Roland CG: Does prayer preserve? *Arch Intern Med* 125:580-587, 1977