TITLE: TWO-DIMENSIONAL ECHOCARDIOGRAPHIC
DETERMINATION OF RIGHT VENTRICULAR
MAXIMUM MINOR AXIS DIMENSION
FRACTIONAL SHORTENING ($MMD_R$)

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The right ventricular (RV) long axis (base to
apex) encompasses major and minor axes. The
maximum minor axis dimension fractional shortening
($MMD_R$) has been proposed, on the basis of logic, as
a potentially useful contractility index.[1] $MMD_R$
measurements have never been reported. This study
addresses that issue.

**Methods.** Twenty adult cardiac surgery patients
fulfilling Human Investigation Committee criteria
were studied. Long axis (LA) 2-D echo images
(transesophageal 5.0 $MH_z$ phased-array transducer)
at the level of the anterior mitral leaflet were
analyzed in terms of diastolic and systolic MMD
(Fig 1) and LA planed area. Determinations were
expressed as ratios. Measurements were obtained
following induction/intubation, sternotomy, and
pericardectomy when the latter was present.
Observer variabilities were calculated as estimate
1 minus estimate 2 divided by mean estimate 1 + 2
and expressed as percent. Estimate 2 viewing order
was by random number table. Relationships were
evaluated by regression analysis, variance ratio
test and Bland-Altman technique. (Fig. 2)

**Results.** $MMD_R$ measurements ($0.32 \pm 0.11$) were
obtainable in 20/20 cases. Intra/Interobserver
variabilities were 8 and 10 percent, respectively.
The $MMD_R$/LA $area_R$ relationship was significant
($n=57; r=0.64$). The hypothesis that respective
variances were not significantly different was not

rejected ($F=1.13; P>0.05$). Differences did not vary
systematically over the measurement range (Fig 2).
**Comment.** Image quality permitted measurement in all
cases. Determinations were reproducible and
comparable in accuracy/inaccuracy to a standard 2-D
echo index. $MMD_R$ measurement offers a perspective
which may be particularly useful in defining RV
regional wall motion abnormalities.

**Reference**
1. Feigenbaum H: Echocardiography. Philadelphia,
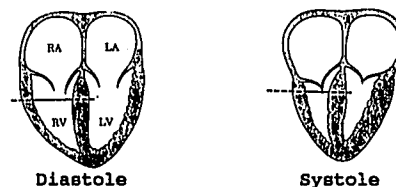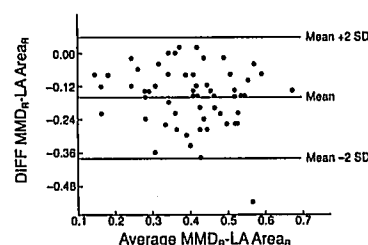PA, Lea and Febiger, 1986, 158-167.

Fig 1.



Diastole            Systole

Fig 2.



Average $MMD_R$-LA $Area_R$

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TITLE: FEASIBILITY OF TELEMETRIC PULSE OXIM-
ETRY MONITORING ON A POSTPARTUM WARD

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Telemetric pulse oximetry networks (TPONs) can
identify low $O_2$ saturation ($SpO_2$) and thus pre-
vent undetected hypoxia. To assess the feasibility
of ward TPON, we developed a computer algorithm to
detect the number of episodes and their duration of
artifacts, disconnections, and alarms.

The study was approved by the institutional re-
view board and informed consent was obtained from 36
postcesarean section patients. A TPON (Nellcor Oxi-
net) with 8 remote oximeters and a central display
station was used to monitor $SpO_2$ for 24 h after
arrival of patients on the ward. $SpO_2$, heart rate,
and plethysmographic waveforms were collected via the
TPON every 10 s. $SpO_2$ data were categorized as
valid or false alarm (nonphysiologic effects of arti-
facts); probe disconnection or oximeter off; and
$SpO_2 < 94\%$ and $< 92\%$. Also, nurses charted the
women's activities and problems. Data from the TPON
and nursing charts were analyzed and categorized by a
signal-processing algorithm to determine the number
and duration of episodes of each type of data.

Eighty-seven percent of TPON data were valid and
11.4% indicated probe disconnection or oximeter off
(table). False alarms accounted for only 1.4% of the
data but occurred frequently ($32 \pm 25$ episodes/24 h).

By incorporating into the alarm a waiting period
equal to the mean duration of a false alarm (0.6
min), the number of false alarms can be reduced by
50%. Alternatively, by lowering the $SpO_2$ alarm
limit from 94% to 92%, the number of alarms can be
reduced almost fivefold. Our data provide a logical
basis for setting alarm limit defaults for TPON and
can be incorporated into an algorithm for discounting
false alarms.

TABLE. Type of Data Recorded by a Telemetric Pulse
Oximetry Network from 36 Women after Cesarean Section

|  | Valid Data | Disconnect Data | False Alarm Data | $SpO_2$ (%) | |
|---|---|---|---|---|---|
|  |  |  |  | < 94 | < 92 |
|  | Cumulative Monitoring Time (min) | | | | |
| Average | 1215.3 | 159.1 | 20.5 | 104.5 | 12.3 |
| SD | 228.9 | 191.1 | 19.4 | 165.1 | 33.4 |
|  | Episodes/24 H (n) | | | | |
| Average | -- | 7.4 | 32.5 | 67.2 | 14.9 |
| SD | -- | 5.9 | 25.2 | 79.5 | 31.0 |
|  | Duration of Each Episode (mean min) | | | | |
| Average | 76.4 | 26.8 | 0.6 | 1.1 | 0.5 |
| SD | 82.6 | 32.8 | 0.1 | 1.0 | 0.4 |

$SpO_2$: $O_2$ saturation detected by pulse oximetry.