Diagnostic Postextrasystolic Carotid Pulse Wave
Change in Idiopathic Hypertrophic Subaortic Stenosis:
Echocardiographic Correlation*

Flavio Reich, M.D.; Sergio V. Cabizuca, M.D.;
Alberto Benchimol, M.D., F.C.C.P.; Kenneth B. Dresser, M.D., F.C.C.P.;
and Connie Sheasby

A characteristic systolic anterior motion (SAM) of
the anterior mitral valve leaflet has been dem-
onstrated by echocardiography in patients with
idiopathic hypertrophic subaortic stenosis (IHSS).
Beat-to-beat alterations of left ventricular geo-
metry, afterload and contractility may alter the degree
of outflow tract obstruction in association with this
disease. Diagnostic postextrasystolic changes of
the external carotid pulse tracing6 and echocardiogram,1,2
have been noted in such subjects. We
describe here the postextrasystolic carotid pulse
tracing and echocardiogram from a patient with dynamic
left ventricular outflow tract obstruction.

Figure 1 shows the simultaneously recorded mit-
tral area phonocardiogram, external carotid arterial
pulse tracing, lead 3 of the electrocardiogram, left
ventricular pressure and echocardiogram in a 41-
year-old man who presented with chest pain, pre-
syncope and a systolic murmur at the tricuspid area.
At cardiac catheterization, there was no resting
gradient within the left ventricle or across the aortic
valve. The septal-to-posterior left ventricular wall
ratio was 2.2, diagnostic of asymmetrical septal hy-
pertrophy (ASH). During sinus rhythm, the exter-
nal carotid arterial pulse tracing showed a small
nondiagnostic midystolic dip and the echocardiog-
gram demonstrated mild SAM of the anterior mitral
valve. Catheter evoked premature ventricular beats
(beats 2, 3, 5) which were succeeded by larger
postextrasystolic left ventricular pressures and diag-
nostic “spike and dome” configurations of the carotid
arterial pulse (beats 4 and 6). The major midystolic
carotid pulse retraction correlated well with en-
hanced SAM of the anterior mitral valve. After in-
halation of amyl nitrite, a left ventricular intracavity
pressure gradient of 35 mm Hg was recorded.

To our knowledge, the simultaneously recorded
phenomena described here have not been previ-
ously reported in a patient with ASH and postex-
trasystolic evoked IHSS. Abnormally positioned papillary muscles,6,4 distortion of the left ventricu-
lar cavity by hypertrophy of the septum and hydro-
dynamic forces generated by left ventricular con-
traction have all been considered possible causes of
SAM in patients with IHSS.9 Potentiation of myo-
cardial contraction following a premature stimu-
lus10 and enhanced left ventricular preload11 are
accepted mechanisms which account for postex-
trasystolic dynamic obstruction to left ventricular
emptying and characteristic intra-arterial pulse con-
tour changes12 in patients with IHSS. It can be surmised that augmented left ventricular contractility
following the premature depolarizations resulted in
increased SAM and revealed the diagnostic carotid
arterial pulse tracing described here.

In conclusion, multiple graphic representations of
intracardiac events and simultaneous external pulse
recording aid in elucidating the dynamic nature of
IHSS.

REFERENCES
1 Shah PM, Gramiak R, Kramer DH: Ultrasound localization
of left ventricular outflow obstruction in hypertrophic
obstructive cardiomyopathy. Circulation 40:3-11, 1969
2 Popp RL, Harrison DC: Ultrasound in the diagnosis and
evaluation of therapy of idiopathic hypertrophic subaortic
3 Pridie RB, Oakley CM: Mechanism of mitral regurgita-

*From the Institute for Cardiovascular Diseases, Good Samar-
itan Hospital, Phoenix.
Supported in part by the E. Nichols & Kim Sigsworth Mem-
orial Funds.
Reprint requests: Dr. Benchimol, 1033 East McDowell Road,
Phoenix 85006