$W\SLFDO '5(66 6\QGURPH ,QGXFHG E\ /HQDOL

9ODFKRSDQRV * .HUNRQWDS YURXODNL (=DFKDURJLDQQLV & DQG $JUDILRWLV $
'HSDUWPHQW RI 1HSKURORJ\ $VNOHSLHLRQ *HQHUDO +RVSLWDO $WKHQV *UHHFH
&RUUHVSRQGLQJ DXWKRU *HRUJLRV 9ODFKRSDQRV 'HSDUWPHQW RI 1HSKURORJ\ $VNOHSLHLRQ *HQ
)D[(PDLO GYODFKRS#PHG XRD JU

5HFHLYHG $SULO $FFHSWHG GDWH -XQH 3XEOLVKHG RQOLQH GDWH

&RS\ULJKW ‹ 9ODFKRSDQRV * HW DO 7KLV LV DQ RSHQ DFFHVV DUWLFOH GLVWULEXWHG XQGHU WKH W
XVH GLVWULEXWLRQ DQG UHSURGXFWLRQ LQ DQ\ PHGLXP SURYLGHG WKH RULJLQDO DXWKRU DQG VRXU

.H\ZRUGV 5(66 V\QGURPH /HQDOLGRPLGH +HPRGLDO\VLV
+\SHUVHQVLWLYLW\ V\QGURPH (RVLQRSKLOLD

,QWURGXFWLRQ

'UXJ DGYHUVH UHDFWLRQV PDQLIHVWHG ZLWK FXWDQHRXV HUXSWLRQV DUH QRW XQFRPPRQ LQ FKURQLF KHPRGLDO\VLV 'UXJ 5HDFWLRQ ZLWK (RVLQRSKLOLD DQG 6\VWHPDWLF 6\PSWRPV '5(66 V\QGURPH LV D SULPH H[DPSOH RI D UDUH SRWHQWLDOO\ IDWDO FXWDQHRXV UHDFWLRQ DWWULEXWHG WR GUX K\SHUVHQVLWLYLW\ ,W LV W\SLFDOO\ FKDUDFWHUL]HG E\ D ORQJ ODWHQF\ SHULR WZR ZHHNV WR WZR PRQWKV IURP GHUXJ H[SRVXUH WR UDVK HPHUJHQFH WHUP ZDV LQWURGXFHG E\ %RFTXHW HW DO LQ > @ 'XH WR WKH YDUL LLOLW\ LQ FOLQLFDO SUHVHQWDWLRQ DQG WKH ODFN RI FOHDU GLDJQRVW FULWHULD HRVLQRSKLOLD V\QGURPH KDG EHHQ LQLWLDOO\ XVHG VXFK DV ‡DQWLFRQYXOVDQW K\SHUVHQVLWLYLW\ V\QGURPHg '5(66 IUHTXHQF\ KDV EHHQ UHSRUWHG WR EH FDVH DPRQJ WR GUXJ H[SRVXUHV ,Q D SURVSHFWLYH VHYHQ \HDU VWXG\ WKH DQQXDO LQFLGHQFH RI '5(66 V\QGURPH LQ WKH JHQHUDO SRSXODWLRQ ZDV HVWLPDWHG DW > @ 1XPHURXV GUXJV KDYH EHHQ DVVRFLDWHG ZLWK '5(66 V\QGURPH ,Q D FRPSUHKHQVLYH OLWHUDWXUH UHYLHZ FXOSULW GUXJV UHODWHG WR FDVH UHSRUWV RYHU D \HDU SHULRG ZHUH HEHWRFLWH\GH IDVHV ZHUH IRXQG WR EH UHODWHG WR DRPDWLF DQWLFRQYXOVDQWV FDUEDPD]HSLQH SKHQ\WRLQ SKHQREDUELWDO DOORSXULQRO DQG VXOIDVDOD]LQH DGPLQLVWUDWLRQ > @ &OLQLFDO PDQLIHVWDWLRQV RI '5(66 V\QGURPH LQFOXGH IHYHU O\PSKDGHQRSDWK\ FXWDQHRXV HUXSWLRQ KHPDWRORJLF DEQRUPDOLWLHV HRVLQRSKLOLD DW\SLF O\PSKRF\WRVLV DQG LQWHUQDO RUJDQ LQYROYHPHQW SULPDULO\ RI WKH OLYH 'DWD UHJDUGLQJ '5(66 V\QGURPH LQ FKURQLF KHPRGLDO\VLV SDWLHQWV DUH OLPLWHG DQG 1 QV-KHRSRKUVLEOD RQ WKH QDWXUDO KLVWRU\ RI WKH V\QGURPH KDV QRW EHHQ H[SORUHG > @ 7ZR VHWV RI GLDJQRVWLF FULWHULD KDYH EHHQ LQGHSHQGHQWO\ LQWURGXFHG E\ WKH 5HJLVWU\ RI 6HYHUH &XWDQHRXV $GYHUVH 5HDFWLRQV 5HJL6&$5 VWXG\ JURXS DQG WKH -DSDQHVH FRQVHQVXV JURXSFWDVLGHQWLILHG GLDJQRVLV DQG VXVSHFWHG FDVHV > @

/HQDOLGRPLGH D GHULYDWLYH RI WKDOLGRPLGH LV DQ LPPXQRPRGXODWRU\ GUXJ ZKLFK LV LQGLFDWHG IRU WUHDWPHQW RI PXOWLSOH P\HORPD 00 DQG P\HORG\VSODVWLF\QGURPHV OHQDOLGRPLGH KDV EHHQ FRQVLVWHQWO\ DVVRFLDWHG ZLWK WKH GHYHORSPHQW RI VNLQ UDVK ,Q D V\VWHPDWLF UHYLHZ LQFOXGLQJ VWXGLHV ZLWK SDWLHQWV WKH LQFLGHQFH RI OHQDOLGRPLGH DVVRFLDWHG DOO JUDGH UDVK ZDV > @ $OWKRXJK 6WHYHQV -RKQVRQ V\QGURPH 6-6 LV WKH PRVW FRPPRQ FXWDQHRXV KW(<}F DH XR}FHOR WFFW@Pp€ 0p0K ,Q D V•@ñp0W VHXG 4° DW P7