

!" #&/  
4;O <548G=>3> 70AB>AC20==O ?@5?0@0BC

C#,  
(SULPIRYD)

!;:04:  
4VNG0 @5G>28=0: 1 B01;5B:0 AC;L?V@84C;  
4>?>28=8: :@>E<0;L :C:C@C47O=89; ;0:B>70, <=>3V4@0B; ?>2V4>=; F5;N;>70 :@8AB0;VG=0;  
<03=VN AB50@0B.  
V:0@AL:0 D>@<0. "01;5B:8.

\$0@<0:>B5@0?52B8G=0 3@C?0. □=B8?A8E>B8G=V 70A>18. 5=704 "N05A L01.

;V=VG=V E0@0:B5@8AB8:8.  
>:070==O.

>AB@V ?A8EVG=V @>7;048. %@>=VG=V ?A8EVG=V @>7;048 (H87>D@5=VO, E@>=VG=V  
?>@CH5==O =5H87>D@5=VG=>3> E0@0:B5@C: ?0@0=>W40;L=V AB0=8, E@>=VG=89  
30;NF8=0B>@=89 ?A8E>7).

@>B8?>:070==O.

- V428I5=0 GCB;82VABL 4> AC;L?V@84C 01> 1C4L-O:>W 7 4>?>28= ?@5?0@0BC.  
- @>;0:B8=>70;56=V ?CE;8=8 (=0?@8;;04 ?@>;0:B8=>A5:@5BCNG0 045=><0 3V?>DV70 (?@>;0:B8=>  
<0) B0 @0: <>;>G=>W 70;>78).  
- □V4><89 01> ?V4>7@N20=89 4V03=>7 D5>E@><>F8B><8.  
- >AB@0 ?>@DV@VO.  
- □><1V=0FVW 7 =50=B8?0@:V=A>=VG=8<8 03>=VAB0<8 4>?0;V=, @>B83>B8= B0 :V=03>;V4), :>  
<1V=0FVW 7 ;52>4>?>N 01> 0=B8?0@:V=A>=VG=8<8 ;V:0@AL:8<8 70A>10<8 (2;;NG0NG8  
@>?V=>@>); :><1V=0FVW 7 <5EVB078=><, F8B0;>?@0<< B0 5AF8B0;>?@0<< (482. @>74V; «70T  
<>4VO 7 V=H8<8 ;V:0@AL:8<8 70A>10<8 B0 V=HV 2848 270T<>4V9»).

!>AV1 70AB>AC20==O B0 4>78.

;O ?5@>@0;L=>3> 70AB>AC20==O.  
!;V4 702648 ?@87=0G0B8  
@5?0@0B 2 FV9 ;V:0@AL:V9 D>@>A;8E.  
>1>20 4>70 AB0=>28BL 200-1000 <3.

>1VG=V @50:FVW.

I>:C A8AB5<8 :@>2V B0 ;VW A8AB5<8: ;59:>?5=VO, =59B@>?5=VO, 03@0=C;>F8B>7.  
I>:C A5@F52>-AC48==>W A8AB5<8: >@B>AB0B8G=0 0@B5@V0;L=0 3V?>B5=7VO, ?V428I5==O  
0@B5@V0;L=>3> B8A:C, 28?04:8 ?>4>265==O V=B5@20;C QT B0 H;C=>G:>2>W 0@8BBV==O  
H;C=>G:V2, ?0@>:A87<0;L=0 H;C=>G:>20 B0EV:0@4VO B8?C «?V@C5B» (torsades de pointes)B0  
H;C=>G:>20 B0EV:0@4VO, @57C;LB0B<< O:>W <>65 AB0B8 DV1@8;OFVO H;C=>G:V2 G8 7C?8=:0  
A5@FO, @0?B>289 ;5B0;L=89 =0A;V4>:.  
V4 G0A 70AB>AC20==O 0=B8?A8E>B8G=8E 70A>1V2 ?>2V4><;O;>AO ?@> 28?04:8 25=>7=>W B@>  
<1>5<1>;VW, 2;;NG0NG8 ;5B0;L=V 28?04:8 5<1>;VW ;535=52>W 0@B5@VW B0 B@><1>7 3;81>:8E 25=  
I>:C 35?0B>1V;V0@=>W A8AB5<8: ?V428I5==O @V2=O ?5GV=:>28E D5@<5=BV2.  
I>:C 5=4>:@8==>W A8AB5<8: :>@>B:>G0A=0 3V?5@?@>;0:B8=5 (I> 7=8:0T ?VA;O 2V4ABV,  
71V;LH5==O <>;>G=8E 70;>7 B0 1>;N C <>;>G=8E 70;>70E.  
I>:C F5=B@0;L=>W =5@2>2>W A8AB5<8: @0==O 48A:V=57VO (A?0AB8G=0 :@82>H8O,  
>:C;>3V@=V :@878, B@87<), I> 7<5=HCTBLAO ?@8 70AB>AC20==V 0=B8E>;V=5@3VG=8E  
0=B8?0@:V=A>=VG=8E ?@5?0@0BV2.  
:AB@0?V@0  
- ?0@:V=A>=V7< B0 ?>2O70=V A8<8: B@5<>@, 3V?5@B>=VO, 3V?>:V=57VO, 3V?5@A0;V20FVO;  
- 0:V=5B8G=V A8<8, I> AC?@>2>46CNBLAO 01>=5 AC?@>2>46CNBLAO 3V?5@B>=CA< V  
G0AB:>2> ?>A;01;NNBLAO ?@8 70AB>AC20==V 0=B8E>;V=5@3VG=8E 0=B8?0@:V=A>=VG=8E  
035=BV2;

- 3V?5@:V=5B8G=0-3V?5@B>=VG=0, 71C4;820 @CE>20 0:B82=VABL;

- 0:0B87VO.

V7=O 48A:V=57VO, 4;O O:>W E0@0:B5@=V <8<>2V;L=V @8B:@5<0 O78:0 V/01> >1;8GGO, O:0 <65 A?>AB5@V30B8AL C E>4V B@820;8E :C@AV2 ;V:C20==O 2AV<0 =59@>;5?B8:0<8; 2 FL> ;V=5@3VG=V 0=B8?0@:V=A>=VG=V ?@5?0@0B8 =5 5D5:B82=V B0 <6CBL ?>A8;N20B8 ;;V=VG=V ?@>O28.

0A?>:V9;8289 5D5:B 01> A>=;82VABL.

04E>48;8 ?>2V4><;5==O ?@> 157A>==O B0 715=B565=VABL

!C4><8 (482. @>74V; «A>1;82>ABV 70AB>AC20==O»).

>B5=V9=> ;5B0;L=89 7;>O:VA=89 =59@>;5?B8G=89 A8=4@< (482. @>74V; «A>1;82>ABV 70AB>AC20==O»).

I>:C H:V@8 B0 ?V4H:V@=>W ;;VB:>28=8: <0:C;>?0?C;L>7=89 28A8?, :@>?82□O=0.

I>:C VW A8AB5<8: 0=0DV;0:B8G=V @50:FVW, 7048H:0 B0 0=0DV;0:B8G=89 H>:.

030;L=V @>7;048 B0 @50:FVW C 71V;LH5==O <0A8 BV;0, @50:FVW 3V?5@GCB;82>ABV.

!B0=8 ?@8 203VB=>ABV, C ?VA;O?>;>3>289 B0 ?5@8=0B0;L=89 ?5@V>48:A8=4@< 2V4 2>=0@>465=8E.

**5@54>7C20==O.**

>A2V4 I>4> ?5@54>7C20==O AC;L?V@84C >1<565=89. >6CBL A?>AB5@V30B8AO 48A:V=5B8G=V ?@>O28 7V A?07<0B8G=>N :@82>H8TN, ?@>B@C7VTN O78:0 B0 B@87<<. # 45O:8E E2>@8E <>6CBL @>728=CB8AO ?@>O28 ?0@:V=A>=V7 AB0=>2;OBL =5157?5:C 4;O 68BBO, 01> =02VBL :<0. >65 A?>AB5@V30B8AL A>=;82VABL.

!C;L?V@84 G0AB:>2> 282>48BLAO ?@8 35<>4V0;V7V. !?5F8DVG=89 0=B84>B 4;O AC;L?V@84C 2V4ACB=V9.

V:C20==O <0T 1CB8 A8<0B8G=5: @50=V<0FVO, ?@8 @5B5;L=>=B@>;V A5@F52>W 4VO;L=>ABV B0 48E0;L=>W DC=:FVW (@878: ?@>;>=30FVW V=B5@20;C QT B0 H;C=>G:>28E 0@8B28=5= ?@>4>26C20B8AO 4> ?>2=>3> >4C60==O E2>@>3>. # @07V @>728B:C BO6:>3> 5:AB@0?V@03> A8=4@>48B8 0=B8E>;V=5@3VG=V ?@5?0@0B8.

**0AB>AC20==O C ?5@V>4 203VB=>ABV 01> 3>4C20==O 3@C44N.**

03VB=VABL. # B20@8= A?>AB5@V30;>AO 7=865==O D5@B8;L=>ABV, ?>2'O70=5 7 D0@<0:>;>3VG=8 <8 2;0AB82>ABO<8 ;V:0@AL:>3> 70A>1C (>?>A5@54:>20=89 ?@>;0:B8=< 5D5:B). >A;V465==O =0 B20@8=0E =5 2:07CNBL =0 157?>A5@54=V9 01> >?>A5@54:>20=89 H:V4;8289 2?;82 =0 ?5@51V3 203VB=>ABV, @>728B>: 5<1@V>=V2/?;>4V2 V/01> ?>AB=0B0;L=89 @>728B>:.)>4> ;N459 4>ABC?>0 4C65 >1<565=0 :V;L:VABL 40=8E ?@> 2?;82 =0 ?5@51V3 203VB=>ABV. 0965 2 CAVE 28?04:0E ?>@CH5==O @>728B:C ?;>40 01> =>2>=0@>465=>3>, ?@> O:V ?>2V4><;O;>AO 2 :>=B5:ABV 70AB>AC20==O AC;L?V@84C ?V4 G0A 203VB=>ABV, 4>?CA:0NBLAO 0;LB5@=0B82=V ?>OA=5==O, O:V 740NBLAO 1V;LH V<>2V@=8<8. "0:8< G8=<<, G5@57 >1<565=89 4>A2V4, 70AB>AC20==O AC;L?V@84C ?V4 G0A 203VB=>ABV =5 @5:<5=4CTBLAO. @8 70AB>AC20==V 0=B8?A8E>B8:V2, 2;:NG0NG8 cC;L?V@84, 2?@>4>26 B@8<5AB@C 203VB=>ABV VA=CT @878: 28=8:=5==O ?>1VG=8E @50:FV9, 7>:@5<0 5:AB@0?V@0< B0 A8=4@< 2V47 @V7=8< ABC?5=5< BO6:>ABV B0 @V7=>N B@820;VABN), ?@8 O:8E <>65 71VG=8E @50:FV9 C =>2>=0@>465=8E ?VA;O ?>;>3V2. >2V4><;O;>AL ?@> 28?04:8 068B0FVW, 3V?5@B>=VW, 3V?>B>=VW, B@5>@C, A>=;82>ABV, 48E0;L=>3> 48AB@5A-A8=4@>@CH5==O ?@8 3>4C20==V. ">B@V1=> ?@>2>48B8 @5B5;L=89 <=>VB>@8=3 AB0=C =>2>=0@>465=8E.

>4C20==O 3@C44N. A:V;L:8 AC;L?V@8428O2;OTBLAO C 3@C4=>

**VB8.**

5 @5:><5=4CTBLAO 70AB>A>2C20B8 ?@5?0@0B C FV9 ;V:0@AL:V9 D>@.

**A>1;82>ABV 70AB>AC20==O.**

# 45O:8E E2>@8E AC;L?V@84 <>65 A?@>2>:C20B8 <>B>@=C 068B0FVN. @8 ?@>O2V A8cC;L?V@84 V7 70A?>:V9;828<8 70A>10<8. :@V<>A>1;828E 28?04:V2, F59 ;V:0@AL:89 70AV1 =5 A;V4 ?@87=0G0B8 ?0FVT=B0< 7 E2>@>1>N 0@:V=A>=0.

:AB@0?V@0@CH5==O B0 <>B>@=5 71C465==O (0:0B87VO) <>6;82V ;8H5 C =525;8:>W :V;L:>ABV ?0FVT=BV2. >65 1C45 ?>B@V1=8< 7<5=H5==O 4>78 G8 ?@89>< 0=B8?0@:V=A>=VG=8E ;V:0@AL:8E 70A>1V2.

VA;O @V7:>W 2V45?B8G=8E 70A>1V2 ?>2V4<;O;8 ?@> 3>AB@89 A8=4@< 2V4BC, 1;N20==O, ?>B>284V;5==O B0 157A>==O. "0:>6 <>65 AB0B8AO @5F8482 ?A8E>B8G=8E A82V4<;O;>AO ?@> 28=8:=5==O <8<>2V;L=8E @CEV2, B0:8E O: 0:0B87VO, 48AB>=VO, 48A:V=57VO. "<5=4CTBLAO ?>ABC?>20 2V43> 70A>1C.

!C;L?V@84 A?@8G8=OT ;8H5 =57=0G=V 7 =59@>;5?B8:8 <>6CBL 7<5=H8B8 5?V;5?B>35==89 ?>@V3, B> >FV=:C FL>3> ?>@CH5==O ?@8 ?@89>2>48;8. 5:<5=4CTBLAO ?@87=0G0B8 ?@5?0@0B 7 >15@56=VABN ?0FVT=B0< 7 =5AB01V;L=>N 5?V;5?AVTN, 0 70 E2>@8<8 7 5?V;5?AVTN 2 0=0<=57V ?>B@V1=> A;V4:C20B8 ?V4 G0A ;V:C20==OcC;L?V@84> %>@8<, 4;O ;V:C20==O O:8E ?>B@V15= AC;L?V@84 V O:V >B@8B8AC4<<=C B5@0?VN, 4>7C ?@>B8AC4<<=>3> ?@5?0@0BC 7B@V1=>. >2V4<;O;>AO ?@> 28?04:8 AC4<< <'O7V2 C ?0FVT=BV2 157 5?V;5?AVW 2 0=0<=57V.

A:V;L:8 ?@8 70AB>AC20==V 0B8?>28E 0=B8?A8E>B8G=8E 70A>1V2 <>6;8289 @>728B>: 3V?5@3;V:5 AV1, O:V E2>@VNBL =0 4V015B 01><0NBL D0:B>@8 @878:C @>728B:C 4V015BC, =0 ?>G0B:C ;V:C20==O AC;L?V@84< A;V4 ?@>2>48B8 =0;56=89 <=>VB>@8=3 @V2=O 3;N:>78 2 :@>2V.

!C;L?V@84 =5 <0T 0=B8E>;V=5@3VG=>3> 2?;82C.

/: V ?@8 ?@89>1V2, O:V 2 >A=>2=>4OBLAO =8@:0<8 ?0FVT=B0< 7 =8@:>2>N =54>AB0B=VABN @5:> <5=4CTBLAO 7=865==O 4>7C20==O B0 ?>A8;5=89 <=>VB>@8=3; C @07V A5@9>7=>W =8@:>2>W =54>AB0B=>ABV 1060=> ?@>2>48B8 ?5@5@82G0ABV :C@A8 ;V:C20==O.

V4 G0A ;V:C20==O AC;L?V@84< =5>1EV4=> @5B5;L=VH5 A?>AB5@V30B8 70 E2>@8<8 =0 5?V;5?AVN, >A:V;L:8 AC;L?V@84<>65 7=86C20B8 AC4<<=89 ?>@V3, ?0FVT=B0<8 ;VB=L>3> 2V:C, O:V 1V;LH AE8;L=V 4> @>728B:C ?>ABC@0;L=>W 3V?>B5=7VW, A540B82=>3> 2?;82C B0 5:AB@0?V@02V4<<;5==O ?@> 28?04:8 28=8:=5==O AC4<< C ?0FVT=BV2, O:V ;V:C20;8AO AC;L?V@84<< (482. @>74V; <<>1VG=V 4VW»).

@8 70AB>AC20==V 0=B8?A8E>B8:V2, 2;;NG0NG8 cC;L?V@84, ?>2V4<;O;>AL ?@> 28?04:8 28=8:=5==O ;59:>?5=VW, =59B@>?5=VW B0 03@0=C;>F8B>7C. =D5:FVW =57OA>20=>3> ?>E>465==O G8 ;8E><0=:0 <>6CBL 2:07C20B8 =0 48A:@07VN :@>2V B0 ?>B@51CNBL =5309=>3> ;01>@0B>@=>3> 0=0;V7C :@>2V.

5:<5=4>20=> C=8:0B8 70AB>AC20==O cC;L?V@84C E2>@8< 7 3>AB@>N ?>@DV@VTN.

>B5=5V9=> ;5B0;L=89 7;>O:VA=89 =59@>;5?B8G=89 A8=4@<<

# @07V ?V42815==O B520=>W 5BV>;>3VW ;V:C20==O AC;L?V@84< =5>1EV4=> =5309=> ?@8?8=8B8, >A:V;L:8 F5 <>65 1CB8 >4=8< V7 A8O:VA=>3> A8=4@>=>=>V @>7;048, ?>@CH5==O A2V4<>ABV, @83V4=VABL<'O7V2).

7=0:8 02B>=><=>W 48ADC=:FVW, B0:V O: ?>BV==O V 73> B8A:C, <>6CBL @>72820B8AO 4> ?>O28 3V?5@B5@

%>G0 F59 5D5:B =59@>;5?B8:V2 <>65 <0B8 V4V>A8=:@0B8G=C ?@8@>4C, <>6CBL 1CB8 ?@8ACB=V D0:B>@8 @878:C, B0:V O: 7=52>4=5==O B0 >@30=VG=5 ?>H:>465==O 3>;>2=>3> <>7:C.

>4>265==O V=B5@20;C QT

@89>< AC;L?V@84C <>65 A?@>2>:C20B8 ?>4>265==O V=B5@20;C QT. &5 71V;LHCT @878: @>728B:C A5@9>7=8E 25=B@8:C;O@=8E 0@8B:@5<0 42=>0?@02;5=>W 25@5B5=>?>4V1=>W H;C=>G:>2>W B0EV:0@4VW, O:0G0ABVH5 A?>AB5@V30TBLAO C ?0FVT=BV2 7 1@048:0@4VTN, 3V?>:0;VT465=8< 01> =01CB8< ?>4>265==O< QT (:;>8 AC;L?V@84 ?@89<0B8 >4=>G0A=> 7 ;V:0@AL:8< 70A>1><, O:89 ?@872>48BL 4> ?>4>265==O V=B5@20;C QT).

5:<5=4CTBLAO 4> ?>G0B:C ?@89>2V4=> 4> ;V=VG=>3> AB0BCAC ?0FVT=B0, :>=B@>;N20B8 D0:B>@8, O:V <>6CBL A?@80B8 ?@>O2C ?>@CH5=L G0AB>B8 A5@F518BBO:

1@048:0@4VO <5=H5

55 C40@V2/E2, 5;5:B@>;VB=89 48A10;0=A, 0 A0<5 3V?>:0;VTB@V1=> :>@83C20B8), 2@>465=5 ?>4>265==O V=B5@20;C QT.

"@820;5 ;V:C20==O ?@5?0@0B<< <>65 A?@8G8=8B8 28@065=C 1@048:0@4VN (<5=H5 55 C40@V2 /E2), 3V?>:0;VTA5@F52C ?@>2V4=VABL G8 ?>4>265==O V=B5@20;C QT.

!C;L?V@84 ?>B@V1=> 7 >15@56=VABN ?@87=0G0B8 ?0FVT=B0< 7 B0:8<8 D0:B>@0<8 @878:C, 0 B0:>6 E2>@8< V7 A5@F52>-AC48==8<8 ?>@CH5==O<8, AE8;L=VABN 4> ?>4>265==O V=B5@20;C QT. 0 28=OB:>< =52V4;:04=8E 28?04:V2, @5:><5=4CTBLAO ?@>25AB8 -4>A;V465==O ?V4 G0A ?>G0B:>2>3> >1AB565==O ?0FVT=BV2, O:8< =5>1EV4=> >B@8;5?B8G=8< ?@5?0@0B>5 20@B> ?@89 <0B8 ?@5?0@0B >4=>G0A=> 7 V=H8<8 =59@>;5?B8:0<8.

=AC;LB

>2V4><;O;>AO ?@> ?V428I5=89 @878: V=AC;LBC C ?0FVT=BV2 ;VB=L>3> 2V:C 7 =01CB8< A;01>C<, O:8E ;V:C20;8 ?52=8<8 0B8?>28<8 =59@>;5?B8:0<8. 5E0=V7< 71V;LH5==O FL>3> @878:C =52V4<89. "0:>6 =5 <>6=0 28;:NG0B8 71V;LH5==O @878:C ?@8 ?@89>

0FVT=B8 ;VB=L>3> 2V:C 7 45<5=FVTN

878: ;5B0;L=>3> =0A;V4:C ?V428ICTBLAO A5@54 ?0FVT=BV2 ;VB=L>3> 2V:C, O:V AB@0640NBL =0 ?A8E>7, A?@8G8=5=89 45<5=FVTN, B0 >B@8B8G=8<8 70A>10<8.

%>G0 ?@8G8=8 ;5B0;L=8E =0A;V4:V2 ?@8 70AB>AC20==V 0B8?>28E 0=B8?A8E>B8G=8E 70A>1V2 1C;8 @V7=8<8, 1V;LHVABL A<5@B59 =0AB020;0 2=0A;V4>: 01> A5@F52>-AC48==8E 70E2>@N20=L (=0?@8;:04, A5@F520 =54>AB0B=VABL, @0?B>20 A<5@BL), 01> V=D5:FV9 (=0?@8;:04 ?=52<>=VO).

>2V4><;O;>AO, I> ;V:C20==O AB0=40@B=8<8 0=B8?A8E>B8G=8<8 70A>10<8 <>65 71V;LHC20B8 ;5B0;L=VABL, B0: A0<> O: V C 28?04:C 7 0B8?>28<8 0=B8?A8E>B8G=8<8 70A>10<8.

V4?>2V4=0 @>;L 0=B8?A8E>B8G=>3> 70A>1C B0 E0@0:B5@8AB8: AB0=C ?0FVT=B0 C ?V428I5==V @V2=O ;5B0;L=>ABV 70;8H0TBLAO =5287=0G5=>N.

5=>7=0 B@><I>5<I>;VO

V4 G0A 70AB>AC20==O 0=B8?A8E>B8G=8E 70A>1V2 ?>2V4><;O;>AO ?@> 28?04:8 25=>7=>W B@> <1>5<1>;VW ("). A:V;L:8 E2>@V, O:V ?@89<0NBL 0=B8?A8E>B8G=V 70A>18, G0AB> <0NBL =0410=V D0:B>@8 @878:C @>728B:C ", 4> B0 ?V4 G0A ;V:C20==OAC;L?V@84>< =5>1EV4=> 287=0G8B8 FV D0:B>@8 B0 268B8 70?>1V6=V 70E>48.

5 @5:><5=4CTBLAO ?@89<0B8 ?@5?0@0B @07>< 7 0;:>3>;5<, ;52>4>?>N, ;VBVT<, 0=B8?0@:V=A>=VG=8<8 03>=VAB0<8 4>?0B8?0@078B0@=8<8 035=B0<8, O:V <>6CBL A?@8G8=8B8 42=>0?@02;5=C 25@5B5=>?>4V1=C H;C=>G:>2C B0EV:0@4VN, <5B04>=><, V=H8<8 =59@>;5?B8:0<8 B0 ;V:0@AL:8<8 70A>10<8, I> <>6CBL 28;:8:0B8 42=>0?@02;5=C 25@5B5=>?>4V1=C H;C=>G:>2C B0EV:0@4VN (482. «70T<>4VO 7 V=H8<8 ;V:0@AL:8<8 70A>10<8 B0 V=HV 2848 270T<>4V9»).

!C;L?V@84 <0T 0=B8E>;V=5@3VG=89 5D5:B, B>15@56=VABN A;V4 70AB>A>2C20B8 C ?0FVT=BV2 7 3;0C:><>N, :8H:>2>N =5?@>EV4=VABN, 2@>465=8< AB5=>7>< (" , 70B@8N A5GV B0 3V?5@?;07VTN ?@>AB0B8 2 0=0<=57V.

!C;L?V@84 ?>B@V1=> 70AB>A>2C20B8 7 >15@56=VABN C ?0FVT=BV2 7V AE8;L=VABN 4> 3V?5@B5=7VW, >A>1;82> C ?0FVT=BV2 ;VB=L>3> 2V:C, G5@57 @878: 28=8:=5==O 3V?5@B>=VG=>3> :@87C.

# @07V 70AB>AC20==O ?@5?0@0BC =02VBL C =87L:8E 4>70E A;V4 72060B8 =0 @878: @>728B:C ?V7=L>W 48A:8=57VW, 7>:@5<0 C E2>@8E ;VB=L>3> 2V:C.

&59 ;V:0@AL:89 70AV17C, B>3> =5 @5:><5=4CTBLAO 70AB>A>2C20B8 ?0FVT=B0< 7 =5?5@5=>A878, ;0:B07=>N =54>AB0B=VABN 01> A8=4@><< =54>AB0B=>ABV 2A<>:BC20==O 3;N:>78 B0 30;0:B>78 (@V4:VA=5 A?04:>25 70E2>@N20==O).

5 20@B> ?@89<0B8 cC;L?V@84 ?V7=> 225G5@V C 72'O7:C 7 <>6;82VABN ?>@CH5=L A=C.

**40B=VABL 2?;820B8 =0 H284:VABL @50:FVW ?@8 :5@C20==V 02B>B@0=A?>@B>< 01> @>1>BV 7 V=H8<8 <5E0=V7<0<8.**

!;V4 ?>?5@548B8 ?0FVT=BV2, >A>1;82> B8E, EB> :5@CT B@0=A?>@B=8<8 70A>10<8 G8 ?@0FNT 7 V=H8<8 <5E0=V7<0<8, ?@> B5, I> ?@89<0==O FL>3> ;V:0@AL:>3> 70A>1C <>65 ?@872>48B8 4> @>728B:C A>=;82>ABV (482. @>74V; «>1VG=V @50:FVW»). V4 G0A 70AB>AC20==O ?@5?0@0BC ?@>B8?>:070=> :5@C20B8 02B>B@0=A?>@B>< B0 ?@0FN20B8 7 V=H8<8 <5E0=V7<0<8.

**70T<>4VO 7 V=H8<8 ;V:0@AL:8<8 70A>10<8 B0 V=HV 2848 270T<>4V9.**

!540B82=V 70A>18

!;V4 ?0<'OB0B8, I> 1030B>;V:0@AL:8E 70A>1V2 01> @5G>28=<>6CBL A?@02;OB8 048B82=89 30;L2C  
A8AB548B8 4> 7<5=H5==O 0:B82=>ABV @>7C<>2>W 4VO;L=>ABV. &V 70A>18 2.;NG0NBL ?>EV4=V  
<>@DV=C (0=0;35B8:8, 70A>18 2V4 :0H;N B0 70), =59@>;5?B8:8, 10@1VBC@0B8, 15=7>4V075?V=8,  
=515=7>4V075?V=>2V 0=:AV>;VB8:8 (B0:V O:<5?@>10<0B), 3V?=>B8G=V 70A>18, A540B82=V  
0=B845?@5A0=B8 (0<sub>1</sub>-0=B83VAB018 F5=B@0;L=>W 4VW, 10.;>D5= V B0;V4>  
@5?0@0B8, O:V <>6CBL A?@8G8=8B8 @>728B>: 42>=0?@02;5=>W 25@5B5=>?>4V1=>W  
H;C=>G:>2>W B0EV:0@4VW (torsades de pointes)  
> FL>3> A5@9>7=>3> ?>@CH5==O A5@F52>3> @8BW 0:B82=>ABV. @>2>:CNG8<8 D0:B>@0<8 T  
3V?>:0;VT =0O2=VABL 2@>465=>3> G8 =01CB>3> ?>4>265==O V=B5@20;C QT.  
> B0:8E 70A>1V2 =0;560BL, 7>:@5<0, 0=B80@8B;5?B8:8.  
# B0:C 270T<>4VN 2ABC?0NBL 5@8B@> 4>;0A5B@>=, A?V@0@<0E 4;O 2=CB@VH=L>25==>3>  
22545==O.  
!C?CB=T 22545==O 42>E «B>@A04>35==8E» (B8E, I> 28.;8:0NBL torsades de pointes) ?@5?0@0BV2  
7030;>< ?@>B8?>:070=5. ;5 28=OB>: AB0=>2;OBL <5B04>= B0 45O:V V=HV ?@5?0@0B8:  
?@>B8?0@078B0@=V 70A>18 (30;>D0=B@8=, ;N<5D0=B@8=, ?5=B0AB> =5 1060=> :><1V=C20B8 7  
V=H8<8 B>@A04>35==8<8 ?@5?0@0B0<8; =59@>;5?B8:8, O:V <>6CBL 7C<>28B8 @>728B>:  
42>=0?@02;5=>W 25@5B5=>?>4V1=>W H;C=>G:>2>W B0EV:0@4VW, B0:>6 =5 1060=>, 0;5 =5  
?@>B8?>:070=> :><1V=C20B8 7 V=H8<8 B>@A04>35==8<8 ?@5?0@0B0<8.  
@>B8?>:070=V :><1V=0FVW  
?>?@0<, 5AF8B0;>?@0<  
V428I5=89 @878: @>728B:C H;C=>G:>28E 0@8BA>1;82> ?>;V<>@D=>W H;C=>G:>2>W B0EV:0@4VW.  
50=B8?0@:V=A>=VG=V 03>=VAB8 4>?0;V=, :V=03>;V4, (@>B83>B8=) =VAB0<8 4>?0;5?B8:0<8 VA=CT  
270T<=89 0=B03>=V7  
51060=V :><1V=0FVW  
@>B8?0@078B0@=V ?@5?0@0B8, O:V <>6CBL A?@8G8=8B8 @>728B>: 42>=0?@02;5=>W  
25@5B5=>?>4V1=>W H;C=>G:>2>W B0EV:0@4VW (30;>D0=B@8=, ;N<5D0=B@8=, ?5=B0G:>28E  
0@8B:@5<0 42>=0?@02;5=>W 25@5B5=>?>4V1=>W H;C=>G:>2>W B0EV:0@4VW.  
/:I> <>6;82>; ;V:C20==O ?@>B83@8I: >28<8 07>;0<8 A;V4 ?@8?8=8B8. /:I> >4=>G0A=>3> ;V:C20==O  
C=8:=CB8 =5 <>6=0, ?5@54 9>3> ?>G0B:>< ?>B@V1=> ?5@52V@8B8 QT-V=B5@20;;, 0 2 E>4V  
;V:C20==O :>=B@>;N20B8 ?>:07=8:8 □□ .  
=B8?0@:V=A>=VG=V 03>=VAB8 4>?0 (0<0=B048=, 0?><>@DV=, 1@><>:@8?B8=, 5=B0:0?>=,  
;V7C@84, ?5@3>;V4, ?V@81548;;, ?@0;;, @>?V=V@>;, @0703V;V=, A5;53V;V=)=VAB0<8 4>?0;5?B8:0<8  
VA=CT 270T<=89 0=B03>=V7  
3>=VAB8 4>?0=VAB0<8 4>?01EV4=5 ?@87=0G5==O =59@>;5?B8:V2, 4>78 03>=VABV2 4>?0ABC?>2>  
7=878B8 (@V7:0 WE 2V4A:V;L:8 >4=>G0A=5 70AB>AC20==O ?@5?0@0BV2 ?@>B8?>:070=5.  
5EV B078=  
V428I5=89 @878: @>728B:C H;C=>G:>28E 0@8BA>1;82> ?>;V<>@D=>W H;C=>G:>2>W B0EV:0@4VW.  
=HV ?@5?0@0B8, O:V <>6CBL A?@8G8=8B8 @>728B>: 42>=0?@02;5=>W 25@5B5=>?>4V1=>W  
H;C=>G:>2>W B0EV:0@4VW: 0=B80@8BEV=V48=, 487>?V@040@>=, 4@>=540@>=, A>B0;>;,  
4>D5B8;V4, V1CB8;V4) B0 V=HV ?@5?0@0B8, B0:V O: 15?@848;;, F8A0?@84, 48D5<0=V;;, 4>;0A5B@>=,  
5@8B@>;0AB8=, ;52>D>;:A0F8=, ?@C:0;>?@84, B>@0 2V=:0728B:C H;C=>G:>28E 0@8B:@5<0  
42>=0?@02;5=>W 25@5B5=>?>4V1=>W H;C=>G:>2>W B0EV:0@4VW.  
=HV =59@>;5?B8:8, O:V <>6CBL 28.;8:0B8 @>728B>: 42>=0?@02;5=>W 25@5B5=>?>4V1=>W  
H;C=>G:>2>W B0EV:0@4VW (0@?@><078=, FV0<5<078=, 4@>?5@84>;, D;C?5=B8:A>;, D;CD5=078=,  
7C:;>?5=B8:A>;, 30;>?5@84>;, ;52>5?@><078=, ?V<>784, 3V?>BV0784, A5@B8=4>;, AC;L?V@84,  
AC;LB>?@84, BV0?@84, 25@0;V?@84). '5@57 ?V428I5=89 @878: @>728B:C H;C=>G:>28E 0@8B:@5<0  
42>=0?@02;5=>W 25@5B5=>?>4V1=>W H;C=>G:>2>W B0EV:0@4VW.  
B0=>;  
>B5=FVN20==O A540B82=8E 5D5:BV2 =59@>;5?B8G=8E 70A>1V2.  
0FVT=B0< A;V4 C=8:0B8 26820==O 0;;>3>;L=8E =0?>W2 01> ;V:0@AL:8E 70A>1V2, O:V  
52>4>?0  
V6 03>=VAB0<8 4>?0;5?B8:0<8 VA=CT 270T<=89 0=B03>=V7  
0FVT=B0< 7 E2>@>1>N 0@:V=A>=0 A;V4 ?@87=0G0B8  
5B04>=

V428I5=89 @878: ?>O28 H;C=>G:>28E 0@8B:@5<0 42>=0?@02;5=>W 25@5B5=>?>4V1=>W H;C=>G:>2>W B0EV:0@4VW.

><IV=0FVW, ?@87=0G5==O O:8E 28<030T >15@56=>ABV

78B@>

V428I5=89 @878: @>728B:C H;C=>G:>28E 0@8BA>1;82> ?>;V<>@D=>W H;C=>G:>2>W B0EV:0@4VW. ?5@V>4 >4=>G0A=>3> 70AB>AC20==O =5>1EV4=> 28:>=C20B8 B0 74V9A=N20B8 ;;V=VG=89 :>=B@>;L.

5B0-I;>:0B>@8, O:V 70AB>A>2CNBL ?@8 A5@F52V9 =54>AB0B=>ABV (1VA>?@>;, :0@2548;>;, <5B>?@>;, =51V2>;, - ?V428I5=89 @878: H;C=>G:>28E 0@8B:@5<0 42>=0?@02;5=>W

25@5B5=>?>4V1=>W H;C=>G:>2>W B0EV:0@4VW. 5>1EV4=89 ;;V=VG=89 <=>VB>@8=3 B0 :>=B@>;L

@5?0@0B8, O:V A?@8G8=ONBL 1@048:0@4VN (7>:@5<0 0=B80@8B:0B>@8, 45O:V 0=B80@8B:0B>@8 :0;LFVT28E :0=0;V2 (48;BV075<, 25@0?0=V48=, 3C0=D0F8=, 3;V:>7848 483VB0;VAC, ?V;>:0@?V=, 0=B8E>;V=5AB5@07=V 70A>18), - ?V428I5=89 @878: @>728B:C H;C=>G:>28E 0@8B:@5<0 42>=0?@02;5=>W 25@5B5=>?>4V1=>W H;C=>G:>2>W B0EV:0@4VW. 5>1EV4=89 ;;V=VG=89 <=>VB>@8=3 B0 :>=B@>;L .

:0@8B@>

V428I5=89 @878: @>728B:C H;C=>G:>28E 0@8BA>1;82> ?>;V<>@D=>W H;C=>G:>2>W B0EV:0@4VW. ?5@V>4 >4=>G0A=>3> 70AB>AC20==O =5>1EV4=> 28:>=C20B8 B0 74V9A=N20B8 ;;V=VG=89 :>=B@>;L.

0;V9=5715@V30NGV ?@5?0@0B8 (:0;V9=5715@V30NGV 4VC@5B8:8, C B><1V=0FVW, ?@>=>A=V 70A>18 AB8W 4VW, 3;N:>:@B8:>W48, B5B@0:>70:B84 V 0B5@8F8= IV), - ?V428I5=89 @878: @>728B:C H;C=>G:>28E 0@8B:@5<0 42>=0?@02;5=>W 25@5B5=>?>4V1=>W H;C=>G:>2>W B0EV:0@4VW.

5@54 22545==O< A;V4 ?@>25AB8 :>@5:FVN =0O2=>W 3V?>:0;VT

>:A8B@>

V428I5=89 @878: @>728B:C H;C=>G:>28E 0@8BA>1;82> ?>;V<>@D=>W H;C=>G:>2>W B0EV:0@4VW. ?5@V>4 >4=>G0A=>3> 70AB>AC20==O =5>1EV4=> 28:>=C20B8 B0 74V9A=N20B8 ;;V=VG=89 :>=B@>;L.

!C:@0;D0B

<5=H5==O 01A>@1FVW AC;L?V@84C C H;C=>2>-.8H:>2>

V6 22545==O< AC:@0;D0BC B0 AC;L?V@84C <0T 1CB8 ?52=89 V=B5@20; G0AC (1V;LH5 2 3>48=, O:I> F5 <>6;82>).

(;C=>:2>-.8H:>2V 70A>18 W 4VW, 0=B0F848 B0 0:B82>20=5 2C3V;;O

<5=H5==O 01A>@1FVW AC;L?V@84C C H;C=>2>-.8H:>2>

V6 22545==O< F8E ?@5?0@0BV2 V AC;L?V@84C <0T 1CB8 ?52=89 V=B5@20; G0AC (1V;LH5 2 3>48=, O:I> F5 <>6;82>).

><IV=0FVW, O:V A;V4 ?@87=0G0B8 7 C@0EC20==O< 270T<>4V9

3V?>B5=782=8<8 70A>10<8.

V428I5=89 @878: 0@B5@V0;L=>W 3V?>B5=7VW, 7>:@5<0 ?>ABC@0;L=>W.

15B0-I;>:0B>@0<8 (:@V< 5A<>;>;C, A>B0;>;C B0 15B0-1;>:0B>@V2, I> 70AB>A>2CNBL ?@8 A5@F52V9 =54>AB0B=>ABV) - AC48=>@>7H8@N20;L=0 4VO V @878: 0@B5@V0;L=>W 3V?>B5=7VW, 7>:@5<0 ?>ABC@0;L=>W (048B82=89 5D5:B).

=HV A540B82=V 70A>18

V;LH 28@065=5 ?@83=VG5==O DC=:FVW F5=B@0;L=>W =5@2>2>W A8AB5<8. '5@57 ?>3V@H5==O 740B=>ABV 4> :>=F5=B@0FVW C2038 :5@C20==O B@0=A?>@B=8<8 70A>10<8 B0 @>1>B0 7 V=H8<8 <5E0=V7<0<8 <>6CBL 1CB8 =5157?5G=8<8.

=VB@0B0<8, =VB@8B0<8 B0 A?>@V4=5=8<8 ?@5?0@0B0<8.

V428I5=89 @878: 0@B5@V0;L=>W 3V?>B5=7VW, 7>:@5<0 ?>ABC@0;L=>W.

@5?0@0B8 ;VBVN

878: ?>O28 =59@>?A8EV0B@8G=8E >7=0.; O:V 2:07CNBL =0 7;>O:VA=89 =59@>;5?B8G=89 A8=4@> 01> >B@CT==O ;VBVT

5>1EV4=> @53C;O@=> :>=B@>;N20B8 ;;V=VG=C :0@B8=C B0 @57C;LB0B8 ;01>@0B>@=8E

0=0;V7V2, >A>1;82> =0 ?>G0B:C >4=>G0A=>3> 70AB>AC20==O.

VBV9 71V;LHCT @878: @>728B:C 5:AB@0?V@01VG=8E 4V9.

!C;L?V@84 <>65 7=86C20B8 5D5:B82=VABL@>?V=>@>;C.

**\$0@<0:>;>3VG=V 2;0AB82>ABV.**

\$0@<0:>48=0

!C;L?V@84 =0;568BL 4> 3@C?8 70 2V4@V7=OTBLAO 2V4 D5=>BV078=V2, 1CB8@>D5=>=V2 B0  
BV>:A0=B5=V2.

)>4> ?>254V=:8 B0 1V>EV3> A::04C, !C;L?V@84 @>74V;OT 7 F8<8 ::0A8G=8<8 =59@>;5?B8:0<8 ?52=V  
2;0AB82>ABV, I> 2:07CNBL =0 0=B03=>=V7< 4>?02>3> @5F5?B>@0 <>7:C. 5@5;V: F8E 2V4AB59  
2::NG0T 1@0: :0B0;5?AVW ?@8 ?@89>7, 0:B82=8E 2 V=H8E ?>254V=:>28E B5AB0E, 2V4ACB=VABL  
5D5:BC ?V4 G0A >1V3C =>@04@5=0;V=C G8 A5@>B>=V=C (5"), =57=0G=C 0=B8E>;V=5AB5@07=C  
0:B82=VABL, 2V4ACB=VABL 2?;82C =0 72'O7C20==O2>3> @5F5?B>@0 G8 @5F5?B>@0 30<<0-0  
<0A;O=>W :8A;>B8. 4=0 7 E0@0:B5@8AB8: AC;L?V@84C 9>3> 1V<>40;L=0 0:B82=VABL, >A:V;L:8 2V=  
<0T 2;0AB82>ABV O: 0=B845?@5A0=B0, B0: V =59@>;5?B8:0. >:@0I5==O =0AB@>N  
A?>AB5@V30TBLAO G5@57 :V;L:0 4=V2 ;V:C20==O, 0 ?>BV< 7=8:0NBL 28@065=V A8<8  
H87>D@5=VW. !540B82=89 5D5:B B0 2V4ACB=VABL 5<>FV9=8E @50:FV9, 70728G09 ?>2'O70=8E 7  
::0A8G=8<8 =59@>;5?B8:0<8 D5=>BV078=>2>3> G8 1CB8@>D5=>=2>3> B8?C, =5 T E0@0:B5@=>N  
@8A>N B5@0?VW !C;L?V@84>

"5@0?52B8G=89 5D5:B ?V4 G0A ;V:C20==O H87>D@5=VW A?>AB5@V30TBLAO G5@57 8-12 B86=V2  
?VA;O ?>G0B:C ;V:C20==O.

!C;L?V@84 0:B82CT A5:@5FVN ?@>;0:B8=C. :B82=0 @5G>28=0 ?>:@0ICT 284V;5==O A;87C B0  
:@>2?>AB0G0==O A;87>2>W >1>;>=:8 H;C=:0 B0 420=04FOB8?0;>W :8H:8.

"0:>6 !C;L?V@84 45<>=AB@CT ?@>B81;N2>B=C 4VN.

\$0@<0:>:V=5B8:0.

!C;L?V@84 ?>2V;L=> 2A<>:BCTBLAO 7 :8H:>2>-H;C=:>2>3> B@0:BC. 002=VABL W6V 7=86CT 2A  
<>:BC20==O =0 30 %. V>4>ABC?=VABL =87L:0 (27-34 %) B0 70;568BL 2V4 >A>18AB8E 2V4AB59.  
:B82=0 @5G>28=0 H284:> =04E>48BL 4> B:0=8=; ;8H5 WW =57=0G=0 :V;L:VABL ?@>=8:0T G5@57 35  
<0B>5=F5D0;VG=89 10@'T@. 0:A8<0;L=0 :>=F5=B@0FVO C ?;072V 4>AO30TBLAO G5@57 3-6 3>48=  
?VA;O ?5@>@0;L=>3> ?@89< AB0=>28BL 1;87L:> 40 %, >1'T< @>7?>4V;C 2V4 1 4> 2,7 ;/:3. 5@V>4  
=0?V2282545==O 7 ?;07<8 :@>2V AB0=>28BL 1;87L:> 8 3>48=. # ?0FVT=BV2 V7 A5@9>7=8<  
?>@CH5==O< DC=:FVW =8@>: 2V= ?>4>26CTBLAO 4> 20-26 3>48= ?VA;O 2=CB@VH=L>25==>3>  
22545==O. 57=0G=0 :V;L:VABL 0:B82=>W @5G>28=8 ?@>=8:0T C 3@C4=5<>;>:. 82>48BLAO V7  
A5G5N B0 :0;< ?5@5206=> C =57

**\$0@<0F52B8G=V E0@0:B5@8AB8:8.**

A=>2=V DV78:>-EVABV: B01;5B:8 1V;>3> G8 <0965 1V;>3> :>;L>@C, 157 70?0EC, 7 3V@:C20B8< A<0:>  
<, :@C3;>W D>@<8, 42>>?C::V, 7 3;045=L:>N ?>25@E=5N 157 ?;O< B0 2V4:>;V2.

"5@ABV.3 @>:8.

#<>28 715@V30==O.

15@V30B8 ?@8 B5ABC?=>

#?0:>2:0.

> 12 B01;5B>: C 1;VAB5@V, ?> 1 1;VAB5@C 2 :>@>1FV01> ?> 15 B01;5B>: C 1;VAB5@V, ?> 2  
1;VAB5@8 C :>@>1FV.

0B53>@VO 2V4?CA:C. 0 @5F5?B<<.

8@>1=8:.

""520 ?5@59H=7 >;0=4.

VAF57=0E>465==O.

C.; >38;LAL:0 80, 31-546 @0:V2, >;LI0.