

**EDITORIAL**

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5 Full title:

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7 Patients' wishes, pregnancy and vascular access: when one size does not fit all.  
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12 Short title:

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14 pregnancy and vascular access  
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## Abstract

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Pregnancy in dialysis patients is a rare but important event that challenges our knowledge and demands re-thinking many aspects of our practice, including vascular access. This editorial briefly discusses some open questions on vascular access in this situation that challenge the motto “fistula first” and underline the need for personalised approaches.

Information on vascular access in pregnant women is scant. Different approaches may be considered between women on dialysis already on a well-functioning tunnelled catheter and newly placed catheters: while a tunnelled catheter in a woman already stabilised on outpatient dialysis, who has shown being able to take correct care of it and who has freely chosen this option, is a reasonable choice, central venous catheters placed during pregnancy, especially in the hospital setting, may have a high risk of complications. Conversely, pregnancy may increase the risk of development of fistula aneurysms, but the frequency of this complication is still unknown.

The problem of whether or not shifting pregnant patients on peritoneal dialysis to daily haemodialysis sessions is still open, as well as the role of patients’ preference for avoidance of an invasive procedure, or refuse of pain. In the wait for answers, reflecting on the problems encountered by pregnant women on dialysis should make us reflect on how to improve vascular access management for all our patients.

KEY WORDS: pregnancy, pregnant, dialysis, hemodialysis, peritoneal, catheter, venous, CVC, vascular access, fistula

1 Pregnancy in dialysis patients is a rare but important, and emotional, event.

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3 Several statements that can be made on this issue: pregnancy is a new clinical  
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6 frontier in dialysis patients (1-2); pregnancy in dialysis is a rare condition that  
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8 represents a valuable occasion for learning how to improve care in common  
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10 situations (3); pregnancy in dialysis is an achievement that becomes possible  
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12 thanks to a strong relationship between patients and physicians.  
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16 As all unusual or new situations, however, pregnancy in dialysis patients  
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18 challenges our knowledge and demands re-thinking many aspects of our  
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20 practice, leaving several open questions still deserving answers.  
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23 The paper by Mehandru and co-workers is addressed at one of these issues:  
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25 vascular access (4). While, at least in principle, the dialysis community agrees on  
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27 the motto “fistula first”, there are many situations, not only limited to elderly,  
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29 high comorbidity patients, in which this may not be feasible, or advisable, and a  
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31 wise compromise between agreed guidelines and patient’s will may be the only  
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33 way to preserve one of pillars of care: a good patient-physician relationship (5-  
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41 The paper reports on three patients who conceived, two of whom had a  
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43 successful pregnancy, while on hemodialysis via a tunnelled catheter. None of  
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45 these patients had catheter related problems in pregnancy or after delivery, thus  
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47 stressing the viability of this option in a situation in which all efforts to deliver an  
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49 optimal dialysis should be done. The paper reports that the three patients were  
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51 on chronic dialysis before conception and “discovered” in due time their  
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53 pregnancy; they were all on dialysis since a short time (5-12 months). The  
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58 Authors do not report on residual renal function (probably present, on the  
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1 account of the short interval between dialysis start and pregnancy, and  
2 important in the management of these patients, and in the preservation of  
3 fertility), and on dialysis schedules, but conception demonstrated by itself the  
4 attainment of a good metabolic balance, in spite of the well-known limits of the  
5 dialysis catheters (1). There is no indication whether pregnancy was desired or  
6 unexpected, but the short delay between conception and discovery of pregnancy  
7 suggests that this possibility was at least considered by the patients.  
8

9 While it would be important knowing more on pregnancy outcomes, such as  
10 birth weight, presence of intrauterine growth restriction, and on the dialysis  
11 schedule (how many hours? 5-7 days per week?), the paper's message is concise  
12 and clear: a tunnelled catheter is compatible with dialysis in the most delicate  
13 moment of a woman with end-stage kidney disease: pregnancy.  
14

15 There are many reasons why this choice, that is justified by the Authors as  
16 following the patients' wish, may be advantageous and allow a safe and excellent  
17 dialysis (table 1).  
18

19 Information on vascular access in pregnant women is scant. Different approaches  
20 may be considered between women on dialysis already on a well-functioning  
21 tunnelled catheter and newly placed catheters: while, as reported by Mehandru  
22 et al (4), a tunnelled catheter in a woman already stabilised on outpatient  
23 dialysis, who has shown being able to take correct care of it and who has freely  
24 chosen this option, is a reasonable choice, compatible with good outcomes (or, in  
25 other words, a lack of negative interference of the vascular access on pregnancy  
26 outcomes), central venous catheters placed during pregnancy, especially in the  
27 hospital setting, may have a high risk of complications (7). Of note, in this large  
28 series of 97 CVC placements in non-dialysis patients who were admitted for  
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1 obstetric care at a tertiary care teaching hospital, one out of 4 had a major  
2 complication, half of which was infectious. This is a remarkably high  
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4 complication rate, although the authors concluded that it was not different from  
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6 that observed in the overall non pregnant population. A similar conclusion was  
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8 recently reached with regard to peripherally inserted catheters in pregnancy and  
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10 puerperium (8).  
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14 Regarding patients with an AV access, an interesting case report (9) warns  
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16 against the risk of development of fistula aneurysms in pregnancy, but the  
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18 frequency of this complication is still unknown and we suggest that patients  
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20 already treated with an AV access should continue to do so, with careful  
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22 observation of the access.  
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27 The problem of whether or not shifting pregnant patients on peritoneal dialysis  
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29 to daily haemodialysis sessions is still open. Because of increased abdominal  
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31 pressure and later in pregnancy because of limited space, as well as for the need  
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33 of better depuration, daily hemodialysis might be considered, which for PD  
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35 patients means inserting a CVC. However, the position of the Italian study group  
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37 on kidney and pregnancy, based upon a systematic review on pregnancy  
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39 outcomes in dialysis patients, encompassing also series and case reports on  
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41 peritoneal dialysis, is more flexible, suggesting that carefully adapted peritoneal  
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43 dialysis may be a sound therapeutic option, in particular in women with residual  
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45 renal function (10,11).  
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52 Finally, the paper by Mehandru et al raises another issue: the authors underline  
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54 that they counselled the patients about creation of an AV fistula and that the  
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56 patients preferred a catheter on the account of lesser aesthetic impact, avoidance  
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58 of an invasive procedure, refuse of pain. We might object that AV fistulae are not  
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1 necessarily disfiguring and that pain management may be effective, provided  
2 that the vascular access is well functioning. Their legitimate answers, however,  
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4 indicates that much is still to be done on this issue. Definitely, one size does not  
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#### 10 11 12 Declarations:

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Table 1.

Reasons for choosing a tunnelled catheter or an AV fistula in a pregnant woman on chronic hemodialysis

|   | <b>Tunnelled catheter</b>  | <b>AV fistula</b>  |
|---|--|--|
| Aesthetic issues                        | Less disfiguring, easy to hide (aneurysms, bottom-hole scars)  | If correctly punctured and well-functioning, it may not be disfiguring; catheters limit activities like swimming, etc.   |
| Pain                                    | No pain  | Pain management is feasible in most cases (local anaesthetics, cryoanesthesia)   |
| Need for surgery                        | Avoidance of surgery   | An invasive procedure may be needed anyway in the case of an infected permcath. Risks of surgery to be balanced with specific risks of catheters (infection, malfunction). |
| Possibility of failed AV access surgery | Avoids risk of AV access malfunction in particular in women with small or damaged vessels  | A skilled surgeon may foresee wise solutions   |
| Transplant                              | Temporary choice in patients waiting for transplantation   | Transplanted patients: lower risk of infection after surgery in patients with high grade immunosuppression in the case of late or non-functioning graft                    |
| Cardiac effects of vascular access      | No risk for worsening the hyperdynamic state of pregnancy  | A distal AV fistula is only rarely associated with a hyperdynamic status.  |
| Infections                              | When correctly managed, tunnelled catheters are compatible with a long infection-free duration   | Lesser risk of infection   |
| Dialysis efficiency                     | Tunnelled catheters may allow high blood flow if correctly managed in women without coagulation problems (which may also affect AV fistulae or grafts) | Better function, better dialysis; however, not all AV fistulae have an optimal function.   |
| Access in daily dialysis                | Lesser risk for catheter malfunction, no pain, no risk for fistula dysfunction   | Daily dialysis is not necessarily associated with risk for vascular access dysfunction, but this should be balanced with the characteristics of the vascular access.       |